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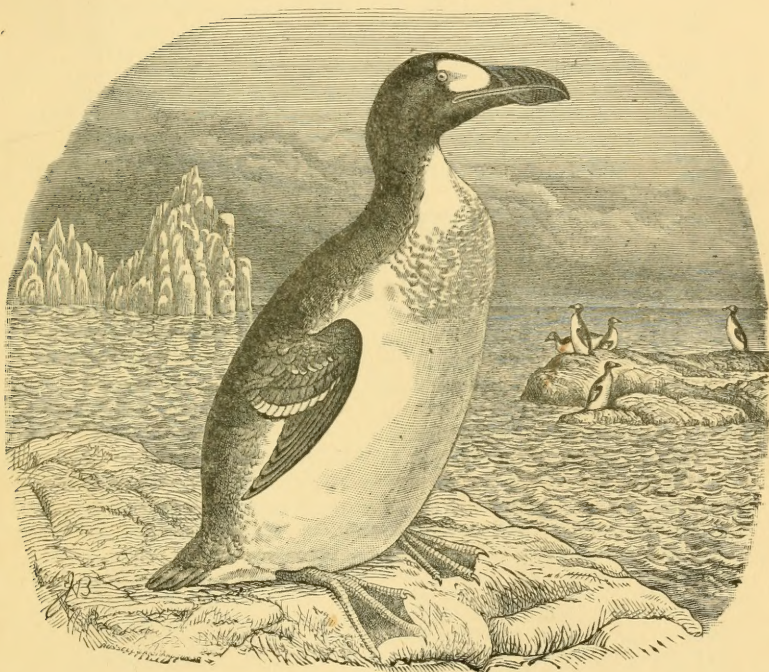
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VOLUME XVII

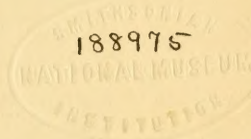
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EDDY, NEWELL A., 615 North Grant St., Bay City, Mich.....	1885
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EVANS, WILLIAM B. Box 129, Moorestown, N. J.....	1897
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KEYS, JAMES EDWARD, 859 Wellington St., London, Ont.....	1899
KELKER, WILLIAM A., Box 114, Harrisburg, Pa.....	1896
KELLOGG, VERNON L., Stanford University, Cala.....	1888
KENDALL, DR. WILLIAM C., U. S. Fish Comm., Washington, D. C.....	1886
KENNARD, FREDERIC HEDGE, Brookline, Mass.....	1892
KEYSER, REV. LEANDER S., 723 So. 5th Av., Atchison, Kan.....	1891
KING, GEORGE GORDON, Newport, R. I.....	1888
KIRKWOOD, FRANK C., P. O. Box 364, Baltimore, Md.....	1892
KITE, NATHAN, 723 N. 44th St., Philadelphia, Pa.....	1899
KNETSCH, ROBERT, Terra Cotta, Ills.....	1898
KNIGHT, ORA WILLIS, 32 Coombs St., Bangor, Me.....	1893
KNOLHOFF, FERDINAND WILLIAM, 28 Winans St., East Orange, N. J.....	1897
KNOWLTON, F. H., U. S. Nat. Mus., Washington, D. C.....	1883
KNOX, JOHN C., 18 State St., Auburn, N. Y.....	1897
KNOX, JOHN COWING, University P. O., Minneapolis, Minn.....	1899
KOBBE, WILLIAM H., Fort Mason, San Francisco, Cala.....	1898
KOCH, PROF. AUGUST, Williamsport, Pa.....	1891
KOCH, FREDERIC W., Merced, Cala.....	1891
KOHN, GUSTAVE, 14 Carondelet St., New Orleans, La.....	1886
KOPMAN, HENRY HAZLITT, Covington, La.....	1899
KOUMLY, REV. PIRMIN M., St. Benedict's College, Atchison, Kansas.....	1892
KUMLIEN, LUDWIG, Milton, Wis.....	1895
LACEY, HOWARD GEORGE, Kerrville, Texas.....	1899
LADD, SAMUEL B., West Chester, Pa.....	1889
LAHEE, EUGENE H., Covina, Cala.....	1893
LAMBERTON, ALEXANDER BYRON, 303 East Av., Rochester, N. Y....	1899
LANO, ALBERT, Aitkin, Minn.....	1890
LANTZ, PROF. DAVID ERNEST, Chapman, Kans.....	1885
LATIMER, MISS CAROLINE P., 63 Remsen St., Brooklyn, N. Y.	1898
LAWRENCE, HIRAM V., 132 Bedford Ave., Brooklyn, N. Y.....	1895

LAWRENCE, ROBERT B., 69 Franklin Place, Flushing, N. Y.....	1883
LEE, Miss MARY, 5131 Morris St., Germantown, Pa.....	1898
LEMMON, WILLIAM P., Englewood, N. J.....	1896
LEUTLOFF, HERMAN C. A., 229 W. 135th St., New York City.....	1896
LEVERING, THOMAS HENRY, 1435 Chapin St., Washington, D. C....	1898
LINK, GUSTAV A., 50 Boggs Av., Pittsburgh, Pa.....	1899
LONG, HORACE B., 14 Anna St., Worcester, Mass.....	1889
LOOMIS, Miss EDNA, Jackson, Mich.....	1897
LOOMIS, JOHN A., Paint Rock, Concho Co., Texas.....	1887
LORING, J. ALDEN, Zoological Park, New York City.....	1889
LOWBER, Miss EMMA WORRELL, 2045 Locust St., Philadelphia, Pa...	1898
LOWE, WILLOUGHBY P., Ardenlee, Llewelyn Road, Cdwyn Bay, No. Wales.....	1893
LUM, GEORGE RENWICK, 18 North St., Stamford, Conn.....	1897
LUSK, RICHARD D., Rosemont, Ariz.....	1894
MACDOUGALL, GEORGE R., 112 Wall St., New York City.....	1890
MACKAY, GEORGE H., Nantucket, Mass.....	1890
MADDOCK, Miss EMELINE, The Rittenhouse, Philadelphia, Pa.....	1897
MAGUIRE, Dr. J. R., Lewistown, Ill.....	1896
MAILLIARD, JOHN W., 307 Sansome St., San Francisco, Cala.....	1895
MAILLIARD, JOSEPH, San Geronimo, Cala.....	1895
MAIRES, Dr. WALTER W., 939 N. 12th St., Philadelphia, Pa.....	1899
MAITLAND, ROBERT L., 170 Broadway, New York City.....	1889
MALI, CHARLES M., 8 Fifth Av., New York City.....	1889
MARBLE, CHARLES C., 6126 Ingleside Av., Chicago, Ill.....	1897
MARSH, DANIEL J., Springfield, Mass.....	1894
MARTIN, JOHN WILLIAM, Palestine, Ore.....	1898
MASON, HOWARD HARRIS, Box 287, Riverpoint, R. I.....	1897
MASTERMAN, ELMER ELLSWORTH, New London, Ohio.....	1895
MATHEWS, Miss CAROLINE, Waterville, Me.....	1898
MAULE, WILLIAM MARIS, Swathmore College, Pa.....	1897
MAYNARD, COLTON, 1407 15th St., N. W., Washington, D. C.....	1895
MCCADDEN, DAVID, 3959 Parrish St., Philadelphia, Pa.....	1898
MCCOOK, PHILIP JAMES, Niantic, Conn.....	1895
MCCORMICK, LOUIS M., Glen Island, N. Y.....	1892
MCGREGOR, RICHARD C., Box 211, Palo Alto, Cala.....	1889
McHATTON, Dr. HENRY, 335 College St., Macon, Ga.....	1898
McILHENNY, EDWARD AVERY, Avery's Island, La.....	1894
MCKENZIE, PETER, 4492 St. Catharine St., Montreal, Can.....	1896
MCKINLAY, JAMES, Pictou, Nova Scotia.....	1898
McLAIN, ROBERT BAIRD, Cor. Market and 12th Sts., Wheeling, W. Va.....	1893
MEAD, GEORGE S., 3300 Washington St., San Francisco, Cala.....	1898
MEARNS, LOUIS DI ZEREGA, Fort Adams, Newport, R. I.....	1899
MEEKER, JESSE C. A., 166 Hough Av., Bridgeport, Conn.....	1899
MERRILL, HARRY, Bangor, Maine.....	1883
MILLER, GERRIT SMITH, Jr., Peterboro', N. Y.....	1886

MILLER, JAMES HENRY, Lowville, N. Y.....	1894
MILLER, Miss MARY MANN, 827 De Kalb Ave., Brooklyn, N. Y.....	1898
MILLER, Mrs. OLIVE THORNE, 827 De Kalb Ave., Brooklyn, N. Y....	1887
MILLER, WALDRON DE WITT, Plainfield, N. J.....	1896
MILLS, HARRY C., Unionville, Conn.....	1897
MITCHELL, Mrs. MINA BAKER, Chattanooga, Tenn.....	1898
MITCHELL, WALTON I., 534 Summit Av., St. Paul, Minn.....	1893
MONTGOMERY, THOMAS H., Jr., Univ. Pennsylvania, Phila., Pa.....	1899
MOON, JOACHIM RICHARD, 934 Broadway, Camden, N. J.....	1898
MOORE, ROBERT THOMAS, Haddonfield, N. J.....	1898
MORCOM, G. FREAN, 125 Commonwealth St., Los Angeles, Cala....	1886
MORISON, GEORGE ABBOT, 17 Farrar St., Cambridge, Mass.....	1896
MORRELL, CLARENCE HENRY, Pittsfield, Me.....	1897
MORRIS, GEORGE SPENCER, Olney, Philadelphia, Pa.....	1887
MORRIS, ROBERT O., Springfield, Mass.....	1888
MORRISON, GEORGE A., Fox Lake, Wis.....	1891
MORSE, GEORGE W., 8612 Morgan St., Chicago, Ill.....	1898
MOSHER, FRANK H., 283 Pleasant St., Malden, Mass.....	1898
MULLIKEN, WILLARD EARLE, Grand Rapids, Mich.....	1898
MURDOCK, JOHN, 195 Walnut Av., Roxbury, Mass.....	1883
MYERS, Miss LUCY F., "Brookside," Poughkeepsie, N. Y.....	1898
NASH, HERMAN W., Box 264, Pueblo, Colorado.....	1892
NELSON, JAMES ALLEN, 248 S. 39th St., Philadelphia, Pa.....	1898
NEWBURY, FREDERICK EARL, 82 Westminster St., Providence, R. I....	1897
NEWMAN, STEPHEN M., D. D., 1818 M. St., N. W., Washington, D. C.....	1898
NICHOLS, JOHN M., Box 45, Peabody, Mass.....	1890
NICHOLSON, AUGUSTUS MILTON, Box 447, Orlando, Fla.....	1898
NORRIS, Rev. JAMES AVERY, Glen Cove, N. Y.....	1894
NORRIS, J. PARKER, 723 Walnut St., Philadelphia, Pa.....	1886
NORTON, ARTHUR H., Westbrook, Maine.....	1890
NORTON, ARTHUR HENRY WHITELEY, Box 918, San Antonio, Texas.....	1894
NORTON, RICHARD, 'Shady Hill,' Cambridge, Mass.....	1888
NOWELL, JOHN ROWLAND, Portman, S. C.....	1897
OVERHOLSER, HARRY C., 1505 Howard Av., Mt. Pleasant, Wash- ington, D. C.....	1888
O'CONNOR, HALDEMAN, 25 No. Front St., Harrisburg, Pa.....	1896
OGDEN, Dr. HENRY VINING, 141 Wisconsin St., Milwaukee, Wis....	1897
OLDS, HENRY WORTHINGTON, 302 New Jersey Av., Washington, D. C.....	1896
O'NEIL, EDWARD, Sewickley, Allegheny Co., Pa.....	1893
ORTH, GEORGE S., Bridgeville, Pa.....	1892
OSBORN, CHASE SALMON, Sault Ste. Marie, Mich.....	1893
OSBURN, RAYMOND CARROLL, Fargo College, Fargo, N. D.....	1899
OSBURN, Rev. WILLIAM, 107 University St., Nashville, Tenn.....	1890
OSGOOD, FLETCHER, 7 Marlboro St., Chelsea, Mass.....	1897

OSGOOD, WILFRED HUDSON, Dept. of Agriculture, Washington, D. C.	1893
OWEN, CHARLES C., 340 Williams St., East Orange, N. J.	1896
OWEN, Miss JULIETTE AMELIA, 306 No. 9th St., St. Joseph, Mo.	1897
PADDOCK, Miss ISABEL MONTEITH, Museum, St. Johnsbury, Vt.	1899
PAGE, MRS. ALICE WILSON, Hotel Margaret, Brooklyn, N. Y.	1896
PAINE, AUGUSTUS G., Jr., 311 W. 74th St., New York City	1886
PALMER, Dr. THEODORE S., Dept. of Agriculture, Washington, D. C.	1888
PALMER, SAMUEL COPELAND, Swarthmore, Pa.	1899
PAPE, CHARLES WESLEY, Manhattan, Kansas	1896
PARKER, J. GRAFTON, Jr., 100 Washington St., Chicago, Ill.	1894
PARKER, WENDELL PHILIPPS, 2 Midland St., Worcester, Mass.	1897
PAYNE, CHARLES, Box 913, Wichita, Kan.	1898
PAYNE, E. B., Catlin, Ill.	1896
PEABODY, Rev. P. B., Hallock, Minn.	1891
PEABODY, WILLIAM RODMAN, 13 Kirkland St., Cambridge, Mass.	1890
PEARSON, T. GILBERT, Guilford College, N. C.	1891
PENNOCK, CHARLES J., Kennett Square, Chester Co., Pa.	1888
PERKINS, CHARLES E., Box 854, Hartford, Conn.	1888
PERRIOR, ALBERT WILLIAM, 316 E. Kennedy St., Syracuse, N. Y.	1897
PETERSON, J. P., West Denmark, Polk Co., Wis.	1885
PHELPS, MRS. ANNA BARDWELL, Box 36, Northfield, Mass.	1899
PHILIP, HOFFMAN, Metropolitan Club, Washington, D. C.	1897
PHILLIPS, A. H., Princeton, N. J.	1891
PIERCE, A. K., Renovo, Pa.	1891
PIERS, HARRY, 'Stanyan,' North West Arm, Halifax, N. S.	1891
POE, Miss MARGARETTA, 1500 Park Av., Baltimore, Md.	1899
POMEROY, FRED ELMER, 164 Holland St., Lewiston, Me.	1899
POMEROY, HARRY KIRKLAND, P. O. Box 575, Kalamazoo, Mich.	1894
POPENOE, Prof. EDWIN A., Topeka, Kan.	1886
PORTER, LOUIS H., Hotel San Remo, New York City	1893
POTTER, RAYMOND B., Box 491, Nyack, N. Y.	1895
POWERS, WILLIAM LINCOLN, Gardiner, Maine	1895
PRAEGER, WILLIAM E., University of Illinois, Urbana, Ill.	1892
PRATT, Rev. GEORGE B., 61 Laffin St., Chicago, Ill.	1895
PREBLE, EDWARD A., Dept. of Agriculture, Washington, D. C.	1892
PRENTISS, D. WEBSTER, Jr., 1218 9th St., N. W., Washington, D. C.	1890
PRICE, WILLIAM THOMPSON, Glen Cove, N. Y.	1898
PRICE, WILLIAM W., The Thacher School, Nordhoff, Cala.	1893
PURDY, JAMES B., Plymouth, Mich.	1893
RALPH, Dr. WILLIAM L., 25 Court St., Utica, N. Y.	1888
RANN, Mrs. MARY L., Manchester, Iowa	1893
RATHBUN, FRANK R., 42½ Franklin St., Auburn, N. Y.	1883
RAWSON, CALVIN LUTHER, Box 33, Norwich, Conn.	1885
READ, ALBERT M., 1140 15th St., N. W., Washington, D. C.	1895
REAGH, ARTHUR LINCOLN, 39 Maple St., West Roxbury, Mass.	1896
REDFIELD, Miss ELISA WHITNEY, 107 No. 34th St., Philadelphia, Pa.	1897
REDINGTON, ALFRED POETT, 1901 Santa Barbara St., Santa Barbara, Cala.	1890

REED, J. HARRIS, 2030 No. Gratz St., Philadelphia, Pa.....	1890
REED, HOWARD S., 1320 Gaylord St., Denver, Colo.....	1894
RHOADS, CHARLES J., Bryn Mawr, Pa.....	1895
RHOADS, SAMUEL N., Audubon, Camden, Co., N. J.....	1885
RICHARDSON, JOHN KENDALL, Wellesley Hills, Mass.....	1896
RICKER, EVERETT WILDER, 16 Alveston St., Jamaica Plains, Mass..	1894
RIDGWAY, JOHN L., U. S. Geol. Surv., Washington. D. C.....	1890
RIKER, CLARENCE B., Maplewood, N. J.....	1885
RILEY, JOSEPH H., Falls Church, Va.....	1897
RIVES, DR. WILLIAM C., 1723 I St., Washington, D. C.....	1885
ROBINS, MRS. JULIA STOCKTON, 114 S. 21st St., Philadelphia, Pa....	1895
ROBERTS, MISS ETHEL DANE, 78 Pittsburg Av., Wooster, Ohio.....	1899
ROBERTS, GEORGE W., Box 66, West Chester, Pa.....	1891
ROBINSON, LIEUT. WIRT, U. S. A., Hubbard Park, Cambridge, Mass.	1897
ROCKWELL, ROBERT BLANCHARD, 3034 W. 24th Ave., Denver, Colo..	1898
RODDY, PROF. H. JUSTIN, State Normal School, Millersville, Pa.....	1891
ROOD, MRS. E. IRENE, 706 Colorado St., Austin, Texas	1893
ROOSEVELT, FRANKLIN DELANO, Hyde Park, N. Y.....	1896
ROOSEVELT, HON. THEODORE, Oyster Bay, Queens Co., N. Y.....	1888
ROTZELL, DR. W. E., Narberth, Pa.....	1893
ROWLAND, MRS. ALICE STORY, 511 W. 7th St., Plainfield, N. J.....	1897
ROWLEY, JOHN, JR., Am. Mus. Nat. Hist., New York City.....	1889
RUSSEL, HOWLAND, 106 Mason St., Milwaukee, Wis.....	1899
RUSSELL, WATERMAN S. C., Bennington, Vt.....	1896
SAGE, HENRY M., Albany, N. Y.....	1885
SAMPSON, WALTER BEHRNARD, 921 No. Monroe St., Stockton, Cala..	1897
SANFORD, FRANK ELWOOD, Supt. Public Schools, La Grange, Ill....	1897
SANFORD, GEORGE ALDEN, 316 W. 82d St., New York City.....	1898
SAVAGE, DAVID LEWIS, Salem, Iowa.....	1894
SAVAGE, JAMES, 134 Abbott St., Buffalo, N. Y.....	1895
SAVAGE, WALTER GILES, Box 77, Hillsboro, Henry Co., Iowa.....	1898
SCHALER, JOHN, Stamford, Conn.....	1893
SCHOENEBECK, AUGUST JOHN, Kelley Brook, Wis.....	1898
SCHRAGE, E. B., Pontiac, Mich.....	1895
SCHURR, PROF. THEODORE A., 14 Lake St., Pittsfield, Mass.....	1888
SCHWAB, REV. LAWRENCE H., 549 W. 156th St., New York City....	1892
SCUDDER, BRADFORD A., Public Library, Taunton, Mass.....	1893
SEISS, COVINGTON FEW, 1338 Spring Garden St., Philadelphia, Pa...1898	
SELOUS, PERCY SHERBORN, Box 1133, Greenville, Mich.....	1898
SHATTUCK, EDWIN HAROLD, Granby, Conn.....	1898
SHATTUCK, GEORGE CHEEVER, 135 Marlboro St., Boston, Mass.....	1896
SHAW, HOLTON A., Grand Forks, No. Dakota.. ..	1898
SHELDON, CHARLES, Apartado 46, Chihuahua, Mexico.....	1898
SHEPARD, MARSHALL, 280 Amsterdam Av., New York City.....	1899
SHEPPARD, EDWIN, Acad. Nat. Sci., Philadelphia, Pa.....	1892
SHERRILL, W. E., Haskell, Texas.....	1896
SHIELDS, ALEXANDER M., Crocker Bldg., San Francisco, Cala.....	1896

SHIELDS, GEORGE O., 19 W. 24th St., New York City.....	1897
SHOEMAKER, FRANK H., Omaha, Neb.....	1895
SHROSBREE, GEORGE, Public Mus., Milwaukee, Wis.....	1899
SHRYOCK, WILLIAM A., 21 N. 7th St., Philadelphia, Pa.....	1893
SILLOWAY, PERLEY MILTON, Rood House, Ill.....	1896
SMITH, CHARLES PIPER, 191 W. 8th St., Anderson, Ind.....	1898
SMITH, HORACE G., 2918 Lafayette St., Denver, Colo.....	1888
SMITH, DR. HUGH M., 1248 New Jersey Ave., Washington, D. C.....	1886
SMITH ROBERT WINDSOR, Kirkwood, Ga.....	1895
SMITH, THEODORE H., 22 Essex Av., Orange, N. J.....	1896
SMITH, S. SIDNEY, 59 Wall St., New York City.....	1888
SMYTH, Prof. ELLISON A., Jr., Agr. and Mech. Coll., Blacksburg, Va.....	1892
SNIVELY, Miss ANNA M., 4746 Madison Av., Chicago, Ill.....	1898
SNYDER, WILL EDWIN, Beaver Dam, Wis.....	1895
SORNBORGER, JEWELL D., Cambridge, Mass.....	1888
SOUTHARD, ROBERT HAMILTON, Cap & Gown Club, Princeton, N. J.....	1898
SOUTHWICK, E. B., Arsenal Bldg., Central Park, New York City....	1888
SOUTHWICK, JAMES M., Mus. Nat. Hist., Providence, R. I.....	1896
SPAULDING, FRED. B., Lancaster, N. H.....	1894
SPRAGUE, WILLIAM ARNOLD, 182 Laurel Hill Av., Olneyville, R. I.....	1898
STANTON, Prof. J. Y., Bates College, Lewiston, Me.....	1883
STEELE, DR. MINOT A., Portsmouth, R. I.....	1898
STEINMETZ, FRANK JACOB, Carson City, Nev.....	1899
STEPHENS, FRANK, 642 Irving Av., San Diego, Cal.....	1883
STEPHENSON, Mrs. LOUISE MCGOWN, Helena, Ark.....	1894
STONE, CLARENCE FREEDOM, Branchport, N. Y.....	1894
STONE, CLAYTON ELBERT, Lunenburg, Mass.....	1899
STONE, DWIGHT D., Lansing, N. Y.....	1891
STRONG, REUBEN M., 11 Mellen St., Cambridge, Mass.....	1889
STUDER, JACOB HENRY, 114 Fifth Ave., New York City.....	1888
STURTEVANT, EDWARD, St. George School, Newport, R. I.....	1896
SUTTON, GEORGE BYRON, Newark Valley, N. Y.....	1896
SWAIN, JOHN MERTON, 319 Commercial St., Portland, Me.....	1899
SWINBURNE, JOHN, Carlton Lodge Castel, Guernsey, England.....	1887
TABOR, ERNEST G., Meridian, N. Y.....	1898
TALLEY, Prof. THOMAS WASHINGTON, Box 523, Tallahassee, Fla....	1896
TATUM, JOSEPH WILLIAM, 843 No. 41st St., Philadelphia, Pa.....	1897
TAYLOR, ALEXANDER O'DRISCOLL, 124 Bellevue Ave., Newport, R. I.....	1888
TEST, DR. FREDERICK CLEVELAND, 4401 Indiana Ave., Chicago, Ill.....	1892
THAYER, ABBOTT H., Scarborough, N. Y.....	1896
THAYER, JOHN ELIOT, Lancaster, Mass.....	1898
THOMAS, HOWARD WELLS, 133 W. 63d St., New York City.....	1898
THOMPSON, ERNEST SETON, 144 5th Av., New York City.....	1883
THOMSON, Prof. GEORGE S., Iknownot, Colo.....	1892
TODD, LOUIS M., Calais, Me.....	1887
TODD, W. E. CLYDE, Beaver, Pa.....	1890
TOPPAN, GEORGE L., 321 Main St., Racine, Wis.....	1886

TORREY, BRADFORD, Wellesley Hills, Mass.....	1883
TOWNSEND, CHARLES H., U. S. Fish Comm., Washington, D. C.....	1883
TOWNSEND, WILMOT, 3d Av. and 75th St., Bay Ridge, N. Y.....	1894
TREAT, WILLARD E., Silver Lane, Conn.....	1885
TROMBLEY, JEROME, Box 54, Petersburg, Mich.....	1885
TROSTLER, ISADOR SIMON, 4246 Farnam St., Omaha, Neb.....	1897
TROTTER, DR. SPENCER, Swarthmore College, Swarthmore, Pa.....	1888
TROTTER, WILLIAM HENRY, 36 No. Front St., Philadelphia, Pa.....	1899
TROY, MISS GERTRUDE ESTELLA, 578 E. 60th St., Chicago, Ills.....	1899
TUTTLE, DR. CARL, Berlin Heights, Ohio.....	1890
UPHAM, MRS. MARY C., Marshfield, Wis.....	1897
UTTER, HERBERT LAMB, 792 Hancock St., Brooklyn, N. Y.....	1898
VAN CORTLANDT, MISS ANNE S., Croton-on-Hudson, N. Y.....	1885
VAN DENBURG, DR. JOHN, Los Gatos, Cal.....	1893
VAN NORDEN, WARNER MONTAGNIE, 25 Nassau St., New York City.....	1899
VAN SANT, MISS ELIZABETH, City Hall, Omaha, Neb.....	1896
VELIE, DR. J. W., Box 2072, St. Joseph, Mich.....	1886
VETTER, DR. CHARLES, JR., 152 Second St., New York City.....	1898
VILARO, DR. JUAN, Havana, Cuba.....	1888
VOELKER, CHARLES A., Adamsford, Del. Co., Pa.....	1897
WALCOTT, ROBERT, 11 Waterhouse St., Cambridge, Mass.....	1893
WALES, EDWARD H., Hyde Park, N. Y.....	1896
WALKER, DR. R. L., 94 Main St., Carnegie, Pa.....	1888
WARREN, DR. B. H., Box 2027, West Chester, Pa.....	1885
WATERMAN, WILLIAM, Bigelow, Minn.....	1896
WATERS, EDWARD STANLEY, Holyoke, Mass.....	1894
WATKINS, L. WHITNEY, Manchester, Mich.....	1894
WEBSTER, MRS. ELLEN EMELINE, Franklin Falls, N. H.....	1898
WEIR, J. ALDEN, 11 E. 12th St., New York City.....	1899
WEST, LEWIS H., Roslyn, Nassau Co., N. Y.....	1887
WHEELER, EDMUND JACOB, 95 Jefferson Av., New London, Conn.....	1898
WHEELER, REV. HARRY EDGAR, Huntsville, Ala.....	1897
WHEELER, JOHN B., East Templeton, Mass.....	1897
WHITAKER, WILLIAM LINCOLN, Cedar Grove, Philadelphia, Pa.....	1894
WHITE, FRANCIS BEACH, 6 Phillips Place, Cambridge, Mass.....	1891
WHITCOMB, MRS. ANNABELL COOK, 721 Franklin St., Milwaukee, Wis.....	1897
WHITMAN, PROF. CHARLES OTIS, Univ. of Chi., Chicago, Ills.....	1896
WHOLEY, WM. N., West Berkeley, Cal.....	1891
WICKS, M. L., JR., Hellman Block, Los Angeles, Cal.....	1890
WILBUR, ADDISON P., 12 Gibson St., Canandaigua, N. Y.....	1895
WILCOX, T. FERDINAND, 7 Upper Pine, Princeton, N. J.....	1895
WILDE, MARK L. C., Box 36, Merchantville, N. J.....	1893
WILLARD, FRANK COTTLE, Tombstone, Ariz.....	1898
WILLIAMS, J. BICKERTON, 32 University St., Montreal, Can.....	1889
WILLIAMS, ROBERT STATHAM, Botanical Garden, New York City.....	1888
WILLIAMS, W. J. B., Holland Patent, N. Y.....	1893

WILSON, KARL DENE, Industry, Pa.....	1899
WILSON, SIDNEY S., 904 B. St., S. W., Washington, D. C.....	1895
WINSLOW, Miss SOPHY, Shore Road and 88th St., Bay Ridge, Brooklyn, N. Y.....	1899
WOOD, NELSON R., Smithsonian Institution, Washington, D. C.....	1895
WOODRUFF, EDWARD SEYMOUR, 14 E. 68th St., New York City.....	1899
WOODRUFF, LEWIS B., 14 East 68th St., New York City.....	1886
WOODWORTH, Mrs. NELLY HART, 41 Bank St., St. Albans, Vt.....	1894
WORCESTER, Prof. DEAN C., 525 Elm St., Ann Arbor, Mich.....	1895
WORTHEN, CHARLES K., Warsaw, Ill.....	1891
WORTHINGTON, WILLIS W., Shelter Island, Suffolk Co., N. Y.....	1889
WRIGHT, FRANK S., 51 Genesee St., Auburn, N. Y.....	1894
WRIGHT, Mrs. MABEL OSGOOD, Fairfield, Conn.....	1895
WRIGHT, Miss NORA GIRALDA, 387 Plainfield St., Olneyville, R. I..	1896
WRIGHT, SAMUEL, Conshohocken, Pa.....	1895
YORKE, Dr. F. HENRY, Foosland, Ill.....	1891
YOUNG, CURTIS CLAY, 395 Clermont Ave., Brooklyn, N. Y.....	1891

DECEASED MEMBERS.

ACTIVE MEMBERS.

Date of Death.

BAIRD, SPENCER FULLERTON.....	Aug. 19, 1887
BENDIRE, CHARLES E.....	Feb. 4, 1897
COUES, ELLIOTT.....	Dec. 25, 1899
GOSS, N. S.....	March 10, 1891
HOLDER, JOSEPH B.....	Feb. 28, 1888
JEFFRIES, JOHN AMORY.....	March 26, 1892
WHEATON, JOHN M.....	Jan. 28, 1887

HONORARY MEMBERS.

BURMEISTER, HERMANN.....	May 1, 1892
GÄTKE, HEINRICH.....	Jan. 1, 1897
GUNDLACH, JUAN.....	March 14, 1896
GURNEY, JOHN HENRY.....	April 20, 1890
HUXLEY, THOMAS H.....	June 29, 1895
KRAUS, FERDINAND.....	Sept. 15, 1890
LAWRENCE, GEORGE N.....	Jan. 17, 1895
PARKER, WILLIAM KITCHEN.....	July 3, 1890
PELZELN, AUGUST VON.....	Sept. 2, 1891
SALVIN, OSBERT.....	June 1, 1898
SCHLEGEL, HERMANN.....	Jan. 17, 1884
SEEBOHM, HENRY.....	Nov. 26, 1895
TACZANOWSKI, LADISLAS.....	Jan. 17, 1896

CORRESPONDING MEMBERS.

BALDAMUS, EDUARD.....	Oct. 30, 1893
BLAKISTON, THOMAS W.....	Oct. 15, 1891
BOGDANOW, MODEST N.....	March 4, 1888
CORDEAUX, JOHN.....	Aug. 1, 1899
HAAST, JULIUS VON.....	Aug. 15, 1887
HARGITT, EDWARD.....	March 19, 1895
HOMEYER, E. F. VON.....	May 31, 1889
LYTTLETON, THOMAS, LORD LILFORD.....	June 17, 1896
MARSCHALL, A. F.....	Oct. 11, 1887
MALMGREN, ANDERS JOHAN.....	April 12, 1897
MIDDENDORFF, ALEXANDER THEODOR VON.....	Jan. 28, 1894
MOSJISOVICS, F. G. HERMANN AUGUST.....	Aug. 27, 1897
PREJEVALSKI, N. M.....	Oct. 20, 1887
PRENTISS, D. WEBSTER.....	Nov. 19, 1899
PRYER, HARRY JAMES STOVIN.....	Feb. 17, 1888
SCHRENCK, LEOPOLD VON.....	Jan. 20, 1894
SEVERTZOW, N.....	Feb. 8, 1885
STEVENSON, HENRY.....	Aug. 18, 1888
WHARTON, HENRY T.....	Sept. —, 1895

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HOWLAND, JOHN SNOWDON.....	Sept. 19. 1885
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SMITH, CLARENCE ALBERT.....	May 6, 1896
STOWE, W. H.....	March —, 1895
THORNE, PLATTE M.....	March 16, 1897
THURBER, E. C.....	Sept. 6, 1896
VENNOR, HENRY G.....	June 8, 1884
WILLARD, SAMUEL WELLS.....	May 24, 1887
WOOD, WILLIAM.....	Aug. 9, 1885



BLACK RAIL.

PORZANA JAMAICENSIS (GMEL.)

NATURAL SIZE.

THE AUK:

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No. 1.

THE LITTLE BLACK RAIL.

BY J. A. ALLEN.

Plate I.

ALTHOUGH the Little Black Rail (*Porzana jamaicensis*) was first made known in 1760, and received its technical christening at the hands of Gmelin in 1788 (Syst. Nat. I, 718), it still remains one of the least known members of its family, and one of the rarest of North American birds in collections. Its entrance into natural history literature was nearly simultaneous in three distinct publications, all dated 1760. Dr. Patrick Browne in his 'Natural History of Jamaica,' gives, on page 479, a brief diagnosis of it in Latin, and adds that this "species has never been described before; it is a very beautiful little bird, and very naturally pictured by Mr. Edwards, in a book with which he intends to favor the public soon."

Mr. Edwards, in his 'Gleanings of Natural History' (Vol. II, 1760, p. 142, pl. 278) describes this little Rail as 'The Least Water-Hen,' and gives of it a very good colored figure. On the same plate is a colored figure of 'The Yellow Wren' (*Dendroica jamaicensis*). He says: "These birds were engraved on the plate immediately from nature, and are both drawn the size of life. The lower bird represents the Water-Hen." And then follows

an excellent and very detailed description of it, following which he says: "These birds were brought from the island of Jamaica by Dr. Browne. The Water-Hen is called Biddy-biddy by the natives of the island in imitation of the noise it makes. I believe this bird hath till now been unknown; there is nothing like it in Sloane's Jamaica . . . See Dr. Browne's account of the least Water-Hen in his history of Jamaica, pa. 479."

Brisson's account (Orn., VI, Suppl., p. 140, also dated 1760) is based entirely on Browne and Edwards, as likewise is Gmelin's, who quotes in addition, however, Buffon and Latham, whose accounts are also based on Browne and Edwards. The accounts of Vieillot (Nouv. Dict. d'Hist. Nat., XXVIII, p. 550) in 1819, and Stephens (Gen. Zoöl., XII, pt. 1, p. 221) in 1824, and of other compilers up to 1838, are all based, either directly or at second hand, on Browne and Edwards. In fact, we get no new information respecting this bird till Audubon, in 1838 (Orn. Biog., IV, p. 359, pl. 349), announced it as a bird of the United States, on the basis of specimens sent him by Mr. Titian R. Peale, in October, 1836. These specimens, an adult male and four young, were taken alive July 22, 1836, apparently in some meadows near Philadelphia, and given to Mr. Peale by Dr. Thomas Rowan. Audubon's plate and description were based on these specimens, and his account of its habits on the letters of Mr. Peale and Dr. Rowan, which he published at length.

The gist of the matter is given in Rowan's letter, which shows that he considered it a common bird at the place where he captured his specimens. His letter, addressed "to the Messrs. Peale," as given by Audubon, is worth quoting in full for its historic interest: "On Saturday last I wrote to you of the Rail Bird breeding in this place. I then described one that I caught last summer, which was unlike the Rail in the fall season, and I presumed that all in the wet ground were the same, but this day¹ my men moving around the pond started up two of the usual kind. The hen flew a few rods, and then flew back to her young in an instant, when they caught her together with her four

¹ This must have been July 22, 1836, judging from Peale's letter to Audubon transmitting Dr. Rowan's.

young, which I herewith send you. Many more can be caught. I have seen them in our meadow every month of the year, but they never make a great noise except when very fat on the wild oat's seed. From the above you will conclude that they do not migrate to the south [=north?], but breed here." From Mr. Peale's letter we learn that the old bird was found, on dissection, to have been "a male, rendering it singularly curious that *he* should have suffered himself to be captured by hand while in defence of the young brood." We also learn that the young died soon after Mr. Peale received them, but that "the old one lived . . . until the 26th of July (four days after its capture), evincing considerable anxiety for the young, as long as they lived."

Mr. Peale also says: "There is now in the Museum [probably Peale's Museum in Philadelphia] a specimen of this species, which has been in the collection for about thirty years, said to have been caught in the vicinity of this city." This is doubtless a record of the earliest known capture of this species in the United States. Mr. Audubon adds: "Since the above was written, I have received a letter from J. Trudeau, M. D., in which he says that his father shot a considerable number of these Rails last winter [probably 1836-37] in the vicinity of New Orleans."

For our next news of this bird we must apparently return to Jamaica. Eighty-seven years after Browne's original discovery of the species, Mr. Philip Henry Gosse, in his 'Birds of Jamaica' (1847, p. 375), says: "A specimen of this little Crake [he calls it the Little Red-eyed Crake] was brought to me in April, alive and unhurt. It lived in a cage two days, but though I enclosed with it a vessel containing water and mud, with aquatic weeds in a growing state, and scattered on it crumbs of bread and pounded corn, it scarcely ate." He describes its manner of walking and its pose, as observed in confinement, and then says: "On two or three occasions, I have seen the species. Near the end of August, pursuing a White Gaulin [or White Heron] in the morasses of Sweet River, several of these little Rails, one at a time, flew out from the low rushes before my feet, and fluttering along for a few yards, with a very laboured flight, dropped in the dense rush again. Their manner of flight, and their figure greatly resem-

bled those of a chicken; the legs hung inertly down. I saw another in February, by the border of the river at the Short Cut, flying with the same feeble and laborious motion from one tuft of herbage to another, whence it would not emerge till almost trodden on." He says he never heard it utter a sound, but quotes from an old manuscript work of a Mr. Robinson, who "in describing two that were brought to him alive in October, 1760 [a date coincident with that of Browne's work already cited!] says, 'their cry was very low, and resembled that of a Coot, when at a great distance' . . . 'Several,' he observes, 'were killed accidentally, by the negroes at work; as they are so foolish as to hide their heads, and, cocking up their rumps, think they are safe, when they are easily taken.' He [Robinson] says elsewhere, 'The negroes in Clarendon call it *Cacky-quaw*, by reason of its cry, which consists of three articulations; the negroes in Westmorland call it *Johnny Ho*, and *Kitty Go*, for the same reason.'" Mr. W. T. March, in a paper on the birds of Jamaica published in 1864 (Proc. Acad. Nat. Sci. Phila., 1864, p. 69) says: "The cry of this species is *chi chi-cro-croo-croo* several times repeated in sharp, high-toned notes, and heard at a considerable distance." He also states that it is "of frequent occurrence about marshy lands, and on the savannahs and open pastures in the vicinity of water."

With this we will dismiss the early history of the Little Black Rail, and turn to later records for the completion of its life history, taking for our new point of departure Baird, Brewer, and Ridgway's 'Water Birds of North America' (Vol. I, 1884, pp. 377-380). Here Dr. Brewer says: "It is known to occur from the Delaware marshes about Philadelphia southward; and is said to be more common in the West India Islands than with us . . . It has been found by Mr. Krider breeding about Philadelphia, and its eggs have been obtained." Mr. Ridgway in the same work (p. 378) gives its range as "Temperate North America, north to Massachusetts, Northern Illinois (breeding), Kansas, Oregon, and California; south through Western South America to Chili; Cuba; Jamaica; Bermudas." (As will be more fully noted later, the South American portion of the range should be eliminated.) From Dr. Brewer's account we learn that the Oregon record is based on information imparted to him by Captain

Bendire. Captain Bendire's published record, in full, is as follows: "Seen on two occasions in the swamps near Malheur Lake, where it unquestionably breeds." (Proc. Boston Soc. Nat. Hist., XIX, 1877, p. 143.) Dr. Brewer also cites Mr. H. W. Henshaw, as authority for its occurrence in California, who believes it, on information furnished by Mr. Gruber, "to be rather common in the extensive tule swamps of that State." Mr. E. W. Nelson is Dr. Brewer's authority for its occurrence in Illinois, Mr. J. H. Batty for its capture in northern Connecticut, Mr. H. A. Purdie for its capture at Saybrook, Conn., and Plymouth, Mass., and Major Wedderburn and Mr. Hurdis for its occurrence in the Bermudas. Some of these references will bear amplification and more precise citation, in connection with later records.

In general terms it may be said that the range of the Little Black Rail is now known to extend from Dueñas, Guatemala (Salvin, Ibis, 1866, p. 198) and the West Indies (Jamaica, various records, Cuba, few records) northward in the eastern United States from Florida and Louisiana to Massachusetts, southern Ontario (Dundas marsh, Nash, in McIlwraith, Birds of Ont., 2d ed., p. 122), Ohio, Indiana, and Northern Illinois (various records). There are also records from Minnesota and Nebraska. Further west, there are a number of records from Kansas, two from Texas, one for Arizona, Lake Malheur, Oregon, and various records from California. There are breeding records from Jamaica, the Delaware marshes, Pennsylvania, Cape May County, New Jersey, Connecticut, Illinois and Kansas. The references to its occurrence at various points on the west coast of South America (Peru and Chili) relate to its near ally, *Porzana salinazi*, now recognized as a distinct species. It may therefore be assumed that its range extends northward, wherever there are localities suited to its peculiar needs, from Jamaica to near the northern border of the United States, and that it breeds throughout this range, retiring southward, at least to the more southern parts of the United States, in winter. The fact of its being so little known is doubtless due not so much to its extreme rarity as to its local distribution and peculiarly secretive habits, characteristic of all Rails, but especially emphasized, apparently, in

the present species. Its small size doubtless also aids in its escaping observation and capture. At least all the early records of its capture seem due purely to accident.

In completion of the present history of the species, a few of the more interesting and important later accounts of its capture may be here transcribed. In 1869 Mr. W. P. Turnbull (*Birds of East Penn. and New Jersey*, p. 33) records it as "Rare. It breeds on the marshes of Cape May County, New Jersey." Mr. Stone says "there is a set of eggs in the Collection of the Academy of Natural Sciences of Philadelphia labeled New Jersey. It may still occur as a rare breeder" (*Birds of Penn. and New Jersey*, 1894, p. 67).

In 1876 Mr. H. A. Purdie recorded a specimen from Clarks Island, Plymouth Harbor, Massachusetts, which was "picked up dead in August, 1869," and also its discovery by Mr. John N. Clark at Saybrook, Conn. Of the latter he says: "Of this species Mr. Clark . . . writes me that a neighbor of his, while mowing at that place, July 10, 1876, swung his scythe over a nest of ten eggs on which the bird was sitting, unfortunately cutting off the bird's head and breaking all but four of the eggs" (*Bull. Nutt. Orn. Club*, II, 1877, p. 22). Eight years later Mr. Clark had the good fortune to discover another nest on "Great Island, a tract of salt meadow near the mouth of the Connecticut River, on its eastern shore," while hunting for nests of the Seaside and Sharp-tailed Finches. This nest was found on the 6th of June, 1884, and contained three fresh eggs. On the 13th of June he again visited the nest and "found therein the full complement of nine eggs." The old bird, however, escaped capture, although Mr. Clark devoted the whole day to this special end, visiting the nest about every half hour. Mr. Clark's very full account of the nest and eggs was published in '*The Auk*,' Vol. I, 1884, pp. 393, 394.

On June 19, 1875, Mr. E. W. Nelson found a nest of this species in the Calumet Marshes, in northern Illinois. The nest contained "ten freshly laid eggs," which, with the nest, Mr. Nelson has very carefully described (*Bull. Nutt. Orn. Club*, I, 1876, p. 43; *Bull. Essex Inst.*, VIII, 1877, pp. 134, 135). Mr. H. H. Brimley and Mr. John S. Cairns have reported the Little Black

Rail from North Carolina, the latter as breeding in Buncombe County (O. & O., XIV, Feb., 1889, p. 17). There are various accounts of its breeding in Kansas, where the late Col. N. S. Goss gives it as a rare summer resident, arriving about the middle of March to the first of April, nesting in May, and returning south in October (Birds of Kansas, 1891, p. 142). Its manner of occurrence in Indiana, Illinois, and Ohio has been well summarized by Mr. A. W. Butler in his 'Birds of Indiana' (1897, pp. 679-681).

The Little Black Rail selects for its nesting place, as would be expected, a wet, grassy meadow, either fresh or salt according to whether the locality is in the interior or on the seacoast. Both Mr. Clark and Mr. Nelson have noted its general resemblance to the nest of the Meadowlark, and describe it as "consisting of fine meadow grasses loosely put together, with a covering of the standing grasses woven over it and a passage and entrance at one side" (Clark); or as "composed of soft grass blades, loosely interwoven in a circular manner," and "placed in a deep cup-shaped depression in a perfectly open situation on the border of a marshy spot, and its only concealment was such as a few straggling *carices* afforded" (Nelson). The nest, as in other species, thus appears to vary with locality and the natural surroundings. A full set of eggs appears to number nine or ten, and are said by Mr. Clark to greatly resemble, in size and color, those of the Meadowlark, but to differ in being of a dull white ("creamy white," Mr. Nelson says), instead of clear white, with the spots and markings rather smaller. They average about 1.00 by .80 in. in size. According to Mr. Nelson's experience, the eggs were placed in two layers, owing to the small size of the nest, which had an inside diameter of 3.25 in.

The secretive habits of the Little Black Rail are well illustrated by Mr. Clark's attempt to secure the female, with his set of the eggs of this species. He says: "I devoted the whole day to this special end, and visited the nest about every half hour through the day, approaching it with every possible caution, and having a little tuft of cotton directly over the nest to indicate the exact spot; but although I tried it from every quarter with the utmost diligence and watchfulness, I was never able to obtain

the slightest glimpse of the bird — never perceived the slightest quiver of the surrounding grass to mark her movements as she glided away, and yet I found the eggs warm every time, indicating that she had just left them."

Plate I accompanying this article, from an excellent drawing by Mr. Fuertes, is a very life-like representation of this rarely seen species. The only previous figures of this species appear to be those published by Edwards in 1760, and by Audubon, in 1838.

THE RUFOUS HUMMINGBIRDS OF CAPE DISAPPOINTMENT.

BY WILLIAM H. KOBÉ.

CAPE DISAPPOINTMENT, formerly called Cape Hancock, forms the extreme southwestern point of Washington State, and is therefore at the mouth of the Columbia River, which enters the Pacific Ocean near the 46th degree of north latitude. Roughly speaking, this cape is in the form of a crescent and extends about one mile into the ocean, thus enclosing a small bay on the side towards the river. The opposite side receives the full force of the Pacific and is cut by the action of the mighty waves into numerous beaches and rocky headlands. In fact, the entire aspect of the cape is very hilly. At one time, I imagine, these hills formed the backbone of the cape, but they are now washed into cliffs on the ocean side and into precipitous slopes on the other. In one place the ocean seems to have broken through and connected with the bay during former centuries, thus forming a low tract or valley in the center of which a small lake has formed.

The climate of this region is rather unique. The warm oceanic current from Japan, flowing south along the coast, causes a very mild climate, and heavy and incessant rains. These rains are caused by the moisture-bearing winds moving inland from the ocean and being chilled against the Cascade Mountains.

The average yearly rainfall is about 53 inches which is distributed abundantly in autumn, winter, and spring, in dews, fogs, rains, and occasional snows. This amount of rain is not remarkable, being about the same as at Philadelphia; but since it all falls in about six months or less, it appears to be much greater for the entire year than it really is.

The result of this wet climate is best seen in the vegetation, which is remarkably luxuriant and green the year round. The entire cape is thus overgrown and where space has not been cleared by the government for a military settlement we find giant spruces and firs standing. Mr. R. H. Lawrence has described this country with such vividness that I cannot resist using his own words. He says, this whole region "is densely covered with a heavy growth of large timber—fir, hemlock, spruce, and cedar. The firs and spruces grow to be giants: it is usual to see them from four to seven feet in diameter, and over two hundred feet high. Underneath these great trees is generally a thick growth of vine-maple, hemlock, large and small, alder, etc., the ground being a network of ferns, vines, bushes, and brush, with fallen giant trees here and there in all stages of decay. On all this much moss grows; and long festoons hang from the branches of the standing trees. Except in the few dry weeks of midsummer, the bushes and ferns are generally wet. With one's face spattered with raindrops and cobwebs, and with an unsure footing, it is no wonder progress is slow through such a tangle."¹ With the exception of the extreme end, the cape is thus an unbroken wilderness. The tip, or end, is occupied by a military post with accommodations for about one hundred men who constitute the entire population. The nearest town is Ilwaco, which lies on the bay about three miles distant, and which is simply a small fishing village consisting of but one main street. The military post is known as Fort Canby, being named after General Canby, the famous Indian fighter. At this place I lived for two years, where my father was commanding officer for that length of time, giving me ample opportunity to study the bird life of the cape.

¹ Auk, Vol. IX, 1892, pp. 39, 40.

Before I speak of any *particular* species, I think it advisable to note the effect of climate and vegetation upon the birds in general found inhabiting the cape. Upon this point Dr. Coues speaks as follows: — "The more varied the face of a country, the more varied its birds. A place all plain, all marsh, all woodland, yields its particular set of birds, perhaps in profusion; but the kinds will be limited in number. It is of first importance to remember this, when you are so fortunate as to have choice of collecting-ground; and it will guide your steps aright in a day's walk anywhere, for it will make you leave covert for open, wet for dry, high for low and back again. Well-watered country is more fruitful of bird-life than desert or even prairie; warm regions are more productive than cold ones. As a rule, variety and abundance of birds are in direct ratio to diversity and luxuriance of vegetation. Your most valuable as well as largest bags may be made in the region most favored botanically, up to the point where exuberance of plant-growth mechanically opposes your operations." This last sentence, I think, expresses the exact position in which an ornithologist is placed when he hunts upon this verdant cape.

The rainfall does not affect the number so much as it does the coloration of birds: it tends to produce darker coloration in all the species occurring in the region. This can be easily seen upon comparing certain species from this section with the same from the arid regions of the South. In the northern forms the colors and shades are not only darker, but also more distinctly and heavily marked. In some species occurring in different regions, these distinctions are so marked that they have led to the dividing of the species into subspecies. This fact is well illustrated by the two subspecies *Falco columbarius suckleyi* (Black Merlin) and *Colaptes cafer saturator* (Northwestern Flicker). Both of these birds are simply dark forms of *Falco columbarius* and *Colaptes cafer*, respectively.

The following is a short list of some other birds in which the coloration is affected by the rainfall: — Sooty Grouse, Sharp-shinned Hawk, Sparrow Hawk, Gairdner's Woodpecker, Rusty Song Sparrow, and Townsend's Sparrow. Of course all birds are affected in some degree, but I think these are more than the others.

The Rufous Hummingbird (*Selasphorus rufus*) does not occur within the rainy region during the wet winters, and is therefore little affected by the moist climate. Mr. R. H. Lawrence states that this Hummingbird arrives at Ilwaco, Wash., on March 9, but I have seen them during the latter part of February or the first of March. The males arrive several weeks before the females, but by the end of April the cape is overrun by these flashing little beings. They are by far the most prominent bird found upon the cape and are probably the most common, although such birds as are retiring in their habits, as the Russet-backed Thrush (*Hylocichla ustulata*), may exceed them in numbers. They are particularly abundant about the flowering salmon-berry bushes and also the thimble-berry, but they seemed to be fonder of the honeysuckle blossoms than of either of the others. These Hummingbirds, although arriving early, do not depart until the rainy season begins, late in the fall. I neglected to put the exact date in my notes, but it is somewhere near the latter part of September, though of course it differs with the season.

The pugnacity of these birds is the most prominent characteristic of the species and when they are not fighting among themselves they make war upon other birds. The males are nearly always the participants and seem to take great delight in fighting each other with their utmost strength. It is a very common sight to see a male Hummer perched upon a telegraph wire or exposed twig watching for others of his own sex with which to do battle. Although they sometimes fall over and over toward the ground like two huge bees, they seldom disable one another, since their bills are very weak. The greatest efforts on the part of one of the Hummers only succeed in pulling out a few feathers of his adversary, who is finally driven away in a rather bedraggled condition. During these aerial battles the males expand their metallic feathers upon the throat and chin, which reflect the sunshine in brilliant colors, thus causing their affrays to appear particularly fierce, besides making them very beautiful on a bright day. I do not remember ever seeing the females fight; they being more retiring and timid than the males. On several occasions I have seen male Hummers fight and drive off Swallows from the vicinity of their nest, particularly when it con-

tained eggs. During the nesting season the males frequently, but not always, sit near the tree in which their home is placed and attempt to drive all birds from the vicinity of the nest. They pay great attention to their duty and seldom fail to dart after other Hummers, even if they are simply passing the tree in which the nest is placed. I have good reasons to believe that they do this more from a love of fighting than from parental instinct or devotion, since the male birds rarely appear upon the scene when their nest is being taken. Their nests may often be located by the actions of the male towards other birds in the vicinity of the nest; and I have found several nests in this way.

On March 19, 1898, while out after birds in a small grove of trees I heard a rather queer rasping note which was new to me. Upon looking around I finally saw a male Hummingbird which would fly upward for about fifty or sixty feet and then suddenly dart towards the ground until it almost touched the earth, where it made the note, which had a very rasping sound and which was quite loud. I have seen them make this note on cloudy as well as on bright days but the latter seem to be the favorite times for going through this queer performance. I have never been able to discover why they do it, but I have come to the conclusion that it has no connection with either the nesting site or with other Hummers of either sex. It seems to be an individual matter of pleasure or possibly alarm.

The nests of this bird may be looked for very early in the spring. The earliest record which I have is a nest found on April 25 of last year which contained young birds about a week old. Of course this is unusual, but nests containing eggs are quite abundant by the latter part of April if the spring is at all early. The nest just spoken of was built upon the bough of a young spruce and it was not over six feet from the ground. I find the following statement in my notes concerning a nest found on May 2. The nest was situated upon the side of a small branch which grew downward from the horizontal limb of a medium sized spruce. In a horizontal line the nest was about twenty feet from the tree trunk and half this distance from the ground. It was very well hidden by the branch upon which it rested, and difficult to find. It was composed of soft green moss

firmly held together by a network of spider webs, and was plentifully lined with plant down obtained from the siskins of the pussy willow. It showed the following measurements: Diameter outside, 1.65 inches; diameter inside, .90 of an inch; depth outside, 1 inch; depth inside, .64 inches. These birds seem to make the outside of their nests correspond as nearly as possible with the color of the surroundings. The foregoing nest was the exact color of the green bough upon which it was built. I also found a nest which was covered on the outside with fine rootlets and weed stems, the color of which corresponded exactly with the color of the dead vine in which it was placed. This nest illustrates very well the fearlessness of this Hummer, since it was placed directly over our front porch in the branches of a dead honeysuckle vine. The following note was probably written by me sometime in April and it speaks as follows concerning the nesting site:— All of the Rufous Hummingbirds' nests which I have thus far found (about twenty in number) were situated upon the boughs of spruce trees, with the exception of two. I have already spoken of one of these as being built in a dead vine. The other was situated in a thimbleberry bush and was only thirty inches, by actual measurement, from the ground. Nearly all of them are composed of lichens and spider webs lined with the down of pussy willow siskins. I think they use the spider webs mainly to make the nest stable, since they are only found on the outside as a sort of network. All the nests found were less than thirty feet from the ground and generally over six. The majority, however, fall between these figures, being over six and less than fifteen. They were always well hidden by the foliage of the thick evergreens in which they are placed, and if it were not for the female darting off her nest, very few would be found. In fact I know of only two or three nests located in other ways. These were found either by accident or by seeing the male Hummer drive off other birds.

Like all Hummingbirds this species lays but two pure white eggs, the average measurements of which are .50 of an inch long and .32 of an inch wide.

The following paragraphs are taken from the descriptions of two sets of eggs of this species taken at this place. The first

set is described as follows: I identified this set by a minute examination of the female as she sat on the nest. I used a powerful telescope and also examined her while she perched upon a telegraph wire. The only other species it could have been was Anna's Hummingbird, but this specimen had the rufous tinge on tail and under parts, so the identification is probably correct. The two eggs, one of which I broke before blowing, were rather thick and I should say the parent had been incubating for about four days. The eggs measure as follows: $.49 \times .32$ and $.48 \times .33$. The nest is composed externally of a large number of different substances and internally of the softest vegetable down. It was situated on the drooping branch of an araucaria tree eight feet from the ground and ten inches from the tip of the branch which extended directly over the middle of the walk. It measures as follows:—Diameter outside, 1.75 inches; diameter inside, .75 of an inch.

The second nest, taken upon the same day—April 10—is described as follows: I identified this set in the same manner as I did the foregoing, but the parent of this one was so tame that she allowed me to approach within a few feet of her as she sat upon her nest, making the identification comparatively easy. On April 7 the nest contained a single egg and the second was not laid until three days after. These two eggs measure respectively $.47 \times .32$ and $.48 \times .31$.

The composition of the nest is about the same as the one just described, excepting that this one has fewer spider webs on it, and it also has one or two small feathers in the lining. The nest was situated upon the drooping branch of a shrub (*Virburnum tinus*) four and one half feet from the ground and eleven inches from the tip of the branch. This nest, like the preceding one, was built near the sidewalk, but was very difficult to find. It measures as follows: Diameter outside, 1.50 inches; diameter inside, .87 of an inch; depth outside, 1.12 inches; depth inside, .75 of an inch.

After taking the nest, I waited for the return of the parent, and when she came and found her home gone she flew about in small circles, scarcely moving an inch from the spot where the nest had been. She continued to do this for about five minutes,

and then, being certain that her nest was gone, she suddenly darted away, not to return as long as I remained there. During all this time the male bird did not appear on the scene and I only recall one instance in my experience with this species when the male has taken any interest in the taking of its nest. They seem to disappear after the nest is completed and not to return until the eggs are hatched. Nor have I ever seen the male feed the female as she sat upon her eggs, which is a common habit with other birds. The females, however, take the utmost interest in their little homes and very soon return after being flushed from their nests, alighting on them with the greatest beauty even when flying swiftly.

After a nest has been taken, a second one is speedily built if it be early in the season; this second nest, however, is generally less exposed than the first one, and is sometimes placed at a greater height. It is a peculiar fact that nine nests out of ten, almost, are placed over paths or gullies, and Mr. A. W. Anthony states that he found six nests in Washington County, Oregon, all of which were found in an old railroad cut.

Soon after the eggs are both laid, the female begins to sit and after a few weeks the young are hatched, naked and helpless little creatures, about the size of a large pea. The parents are now kept busy bringing food, which consists of minute insects contained in the honey and sweets of flowers, to their young. To accomplish this, the parent bird alights upon the rim of the nest and places its bill some distance into the mouths of the young and in this way feeds them. As the young birds develop under the assiduous care of the parents, the tiny nest becomes almost too small for them and they are finally forced to face in opposite directions just as two shoes are put in a box. The nest also becomes somewhat flattened, and by the time the young leave, it is a sorry looking object, unfit to keep.

By the latter part of August all the young had left their nests and the parents were beginning to prepare for their southward migration. A month later all the Hummers have left and the cape is given over to the incessant rains of a long winter.

ON THE PERFECTED PLUMAGE OF THE KING
EIDER (*SOMATERIA SPECTABILIS*).

BY ARTHUR H. NORTON.

IN A private letter written to me by Mr. Fred Rackliff from Big Green Island, Knox Co., Me., under date of December 30, 1898, I have this record: "There are three of the finest King Eiders staying off the east side of the island that you ever saw,—two Drakes and a Duck; they have been here over a month; shall get a shot at them before long."

As a proof of Mr. Rackliff's statement, the Drakes are now before me, and both are indeed fine specimens; but one, a superb Drake, is deserving of more than a passing notice, as it shows a pterylographic adornment, or modification of the outer tertials, not mentioned in the manuals most commonly employed by American students. Two of the outer tertials have their shafts distally depressed, slightly expanded, and curved downward (not laterally as in falcate secondaries); vane outlines asymmetrical by great production of many barbs of the outer web; the barbs of the inner feather have a length of 50 mm.; the vane having tapered suddenly from the base of the feather to this width, becomes suddenly constricted and tapers to the end of the feather which terminates with the naked shaft; the posterior outline of the vane is crescentic, owing to the backward direction of the barbs forming the point of the vane.

The produced parts of the vanes fold, the superior or inner of which is the longer, enclosing the inferior or outer, and both curve slightly upward from the plane of the back at a little less than an angle of 45°, having the effect of a pair of pyramids rising from the posterior border of the scapulars.

Nearly all of the so-called adult Drakes of this species which I have examined, show, though in a far less degree, a production of a part of the outer web of corresponding tertials, suggesting that this adornment is common in the highest phase of maturity,

which according to Temminck, on the authority of Sabine, is not attained until four years (Temm., Man., II, 852).

Though this species has been otherwise minutely described, there exists considerable discrepancy concerning the nomenclature of the delicate colors. I hope, therefore, that a detailed description of the color masses of this specimen, based upon Mr. Ridgway's 'Nomenclature of Colors,' may not seem superfluous.

As the specimens are dried and without full field data, I have nothing to offer concerning the colors of the naked parts, but these have been described by Brisson, Audubon, Baird and associates, as well as by Dr. Coues.

Band of feathers around frontal processes extending backward in a point over lore, wide spot under and extending behind the eye, narrow line around upper eyelid, large A-shaped mark from chin along sides of gular region (57 mm. long), scapulars, tertials, secondaries, primaries, and their coverts, alulae, greater wing coverts, pelvic region of back (tergum¹), tail with both series of coverts, sides except sides of rump, and under parts (venter²) black, very pure and deep on head, throat, venter, rump, secondaries, tertials, and both series of tail-coverts. The scapulars are washed with slate; the primaries, their coverts, alulae, and tail brownish, the four falcate secondaries having brownish shafts.

A spot above the rictus, the chin, upper throat, and sides of neck squarely joining the buff below, entire back of neck below the nape, interscapular wedge, large area at base of tail, median and lesser wing-coverts white. Marginal coverts dusky, with broad hoary tips. Hood extends from forehead and includes the nape, not, however, reaching upper border of the eye. Pileum proper cinereous, deepening to plumbeous on the nape. Lower border of pileum forming a large supra-loral area and narrow line to ear, pearl gray, joined at the ear by a dusky line which reaches around the nape, thus enclosing the plumbeous area. Spot above the eye and narrow line of normal feathers below border of hood very pale wash of malachite green. Sides of head covered with feathers rendered abnormal by their barbs becoming stiffened, and destitute of barbules for at least their exposed portions, thus rendering the parts so covered iridescent: these nude barbs are malachite green in color, but feathers have barbuled bases white, which color, showing through the separated points, gives the cheeks a washed green appearance, so that it has been justly deemed "exceedingly difficult of imitation by colorists."

¹ Sundevall's Tentamen, Nicholson's Trans., p. 297.

² Sundevall's Tentamen, Nicholson's Trans., p. 298.

The loreal and auricular regions are quite rich green. Jugulum and lower throat abruptly joining white above and black below, rich ochraceous buff.

The frontal processes are much more developed than the one shown in the splendid figure in Ridgway's 'Manual,' its anterior outline at a right angle with the line of the tomium, the farthest point from tomium being 38 mm., its greatest width 27 mm., its least width 18 mm., while the greatest depth of bill is 17 mm. The other Drake shows respectively 34, 24, 17 and 18 mm.

Though the birds were reported at the close of December, they spent the winter at the place secure from the various strategies used to approach them, or lure them within shot of the shore, and so it was the beginning of April before they came into the hands of this expert collector. This was due to the fact that the depth of water required to yield their favorite food, — which upon dissection proved to be young holothurians (*Pentacta frondosa*), — kept them farther from the shore than *Somateria dresseri* is accustomed to feed, and this animal being abundant at their chosen spot, they would not condescend to approach decoys as *S. dresseri* did.

According to Hagerup, *S. spectabilis* habitually feeds in deeper water than that required by *Somateria mollissima borealis* in Greenland where both species are abundant (Birds of Greenland, p. 19).

RANGES OF *HYLOCICHLA FUSCESCENS*, AND *HYLOCICHLA FUSCESCENS SALICICOLA* IN NORTH AMERICA.

BY REGINALD HEBER HOWE, JR.

WHILE looking over the Ornithological Collection of the Museum of Comparative Zoölogy, I came across a peculiar specimen of Wilson's Thrush (*Hylocichla fuscescens*) taken at Newport, Rhode Island, by R. L. Agassiz on the very late date for this locality of September 25, 1885. A few days later I happened to

speak to Dr. Walter Faxon in regard to this specimen, and he spoke of always having noticed a peculiarity in late fall migrants of this species in New England. This led me to look into the matter more carefully with the following results.

I find that the range of typical *Hylocichla fuscescens* extends northward to Nova Scotia (Streuracke); Toronto, Ontario; northern Ohio; and westward to Missouri. Audubon recorded it from Newfoundland (Orn. Biog., II, p. 362) and Labrador, the species, however, was probably *Hylocichla alicie*. Mr. William Brewster recorded it from Ellis Bay, Anticosti (Proc. Boston Soc. Nat. His., Vol. XXII, p. 368) where he writes "rather to my surprise I came upon a pair of these Thrushes, . . . they were seen so distinctly that there can be no doubt as to the correctness of the identification." The birds, however, were not taken. Thompson in 'Birds of Manitoba' (Proc. U. S. Nat. Museum, Vol. XIII, p. 633) records this species as an "abundant summer resident," and gives the following localities where the species has been recorded: Pembina; Red River Valley; Selkirk, and Red River; Shoal Lake; Oak Point; Portage la Prairie; Lake Manitoba, and westward; Carberry; Qu' Appelle; but Thompson's records for typical *Hylocichla fuscescens* are probably at fault, the bird inhabiting this region (Manitoba) being undoubtedly *Hylocichla fuscescens salicicola*, for the specimen (Coll. U. S. Nat. Mus. No. 112606) from Shoal Lake, Manitoba, I have examined, and it is typical of this last named race, as are many other specimens examined from the same region. Two specimens (Coll. U. S. Nat. Mus., Nos. 63847, Pembina, Dak., and 13698, Rainy Lake River), identified by Mr. Ridgway as *H. fuscescens* are without doubt *salicicola*, though slightly intermediate, as might be expected, being taken on the border line between the two races.

The range of *Hylocichla fuscescens salicicola* Ridgw., Willow Thrush, is from Missouri (Charleston) and Dakota westward to the Rocky Mountains (Washington, Spokane), south to New Mexico and Arizona, and northward to Manitoba, Rainy Lake River and British Columbia (Kamloops). A series of specimens from Codroy, Newfoundland, in Mr. William Brewster's collection I find to be typical *salicicola*, but I am unable to obtain any

specimen along the line of the 50th parallel of latitude between Newfoundland and Rainy Lake River. Although this apparent hiatus exists, careful comparison and measurements show no difference between specimens from these two localities. The specimen from Chicago, Ill., which Mr. Ridgway cited in the collection of H. K. Coale of that city (No. 15681), taken September 16, was undoubtedly a fall straggler, but probably not so far out of its range as at that time supposed. The bird recorded from Cook Co., Texas (Cook's Migration in the Miss. Valley, Bull. No. 2, U. S. Dept. of Agr., p. 284) was probably also a straggler. The pair of Thrushes observed by Mr. Brewster on Anticosti may have been of this race, for without the bird in the hand it is difficult, though not impossible, to tell it from *Hylocichla fuscescens*, and it seems unlikely that Mr. Brewster should identify *fuscescens* or its subspecies for *aliciæ*. The specimen taken at Newport, before referred to (also typical *salicicola*), and the Willow Thrush recorded from near the town of Chester, South Carolina, October 5, 1888, by Leverett M. Loomis (Auk, Vol. VI, No. 2, p. 194), and a male taken by me at Bristol, Rhode Island, on September 24, 1899 (typical *salicicola*), are probably not stragglers, as one might heretofore have supposed, from the far West, but from Newfoundland. The question at once arises as suggested above, whether *salicicola*, as it inhabits Newfoundland, does not also inhabit Labrador, Anticosti, and surrounding regions, and whether it does not also inhabit the intervening country between its known western and eastern habitats.

It will be interesting to see whether many of the eastern United States collections do not contain specimens of *salicicola* taken late in the fall or perhaps early in the spring, formerly identified as *Hylocichla fuscescens*.¹

It is thought that it may be of value to add here, beside the

¹ Since the above was put in type I have received from Mr. W. E. Saunders a specimen of *H. f. salicicola* from Ottawa, Ont., taken Sept. 19, 1899. Being a fall specimen, it only shows the southward migration of this race extends as far west as Ottawa, or that in case the bird had followed a direct southern route, that the region directly north of Ottawa is inhabited by *H. f. salicicola*, which would be interesting as filling the gap between its western and eastern ranges.

table of measurements of specimens examined, a supplementary description of *Hylocichla f. salicicola*; as Mr. Ridgway's description is in some ways decidedly unsatisfactory.

Upper parts *olivaceous*-tawny, "russet olive" particularly on crown, nape, back, scapulars and tail, most tawny on the rump. Under parts: throat almost immaculate and unmarked, breast suggesting *swainsonii*, dark *olivaceous*-buff, not light tawny buff like *fuscescens*, quite heavily marked with blunt arrow shaped spots of fuscous, especially in the fall, unlike the brownish more penciled markings of *fuscescens*; lower breast and belly white, tinged strongly with *olivaceous* on the sides and flanks; wings *olivaceous*-tawny "russet olive" with the greater, middle and primary coverts tawny; cheeks tawny, but not lores, as in *swainsonii*; upper mandible very dark brown, under horn color, *tipped with brown as in swainsonii*, unlike *fuscescens*, whose under mandible is untipped in the spring and lightly if at all in the fall.

Ridgway states that the breast in adult spring specimens "is only faintly or not at all spotted with darker," which is hardly so, I think even in the very specimens he examined, this marking of the breast being one of the characteristics of *salicicola*; and his measurements, proving the race "averaging decidedly larger" than *fuscescens*, do not agree with mine taken from a much larger series than he tabulates, showing the males of *salicicola* to be only slightly larger, and the females slightly smaller than *fuscescens*, or no real material difference in size.

For the use of specimens for comparison thanks are due to Dr. Chas. W. Richmond and Mr. F. W. True of the U. S. National Museum; Mr. Witmer Stone of the Academy of Natural Sciences, Phila.; Dr. Walter Faxon, Museum Comparative Zoölogy, Cambridge; Mr. William Brewster of Cambridge; Mr. Paul Bartsch of Washington, D. C.; Mr. G. F. Dippie of Toronto, Canada, and Mr. H. B. Bigelow of Boston.

HYLOCICHLA FUSCESCENS SALICICOLA.

Males.

Coll. No.	Collection.	Locality.	Date.	Sex.	Wing.	Tarsus.	Bill.	
							Culmen.	Nostril.
46261	Wm. Brewster, Cambridge	Codroy, Newfoundland	June 1, 1895	♂	4.00	1.18	.50	.39
46264	"	"	" 15, 1895	♂	4.10	1.13	.48	.37
46260	"	"	May 31, 1895	♂	4.03	1.15	.45	.36
46262	"	"	June 1, 1895	♂	3.76	1.20	.48	.35
46263	"	"	" 1, 1895	♂	4.07	1.15	.51	.38
46258	"	"	May 31, 1895	♂	4.02	1.22	.52	.41
46259	"	"	" 31, 1895	♂	3.98	1.19	.45	.35
23331	Comp. Zool., Cambridge	Mouth Blue River, Colorado	June 4, 1877	♂	4.10	1.19	.48	.39
63052	"	Fort Rice, Dakota	" 16, 1873	♂	3.80	1.10	.52	.39
66669	Bryant, Cambridge	Charlestown, Missouri	May 9, 1879	♂	3.88	1.10	.51	.40
10882	U. S. Nat. Mus.	Fort Garland, Colorado	June 19, 1873	♂	3.95	1.17	.48	.38
13698	"	Fort Bridger, Wyoming	May 28, 1858	♂	3.81	1.14	.47	.38
63893	"	Rainy Lake River	" 29, ?	♂	3.90	1.10	.49	.35
65951	"	Souris River	Sept. 16, 1873	♂	3.86	1.16	.52	.39
112606	"	Fort Rice, Dakota	June 14, 1873	♂	4.00	1.14	.49	.35
41519	"	Shoal Lake, Manitoba	May 20, 1887	♂	4.02	1.20	.53	.35
63847	"	Montana	" 1887	♂	4.00	1.23	.51	.38 ?
112605	"	Pembina, No. Dakota	Aug. 19, 1887	♂	3.88	1.20	.51	.37
31555	Acad. Nat. Sciences	Shoal Lake, Manitoba	May 20, 1887	♂	3.86	1.14	.52	.39
31554	"	Kamloops, British Columbia	July 14, 1892	♂	3.91	1.16	.45	.36
31553	"	Clinton, British Columbia	" 6, 1892	♂	3.92	1.15	.47	.36
29240	"	Bonaparte, British Columbia	" 16, 1892	♂	3.90	1.16	.48	.36
790	"	Dickinson Co., Iowa	June, 1881	♂	4.07	1.26	.51	.35
	R. H. Howe, Jr., Brookline	Bristol, R. I.	Sept. 24, 1899	♂	3.85	1.13	.48	.36
Totals, average					3.94+	1.16+	.49+	.37+

HYLOCICHLA FUSCENS SALICOLA.

Females.

Coll. No.	Collection.	Locality.	Date.	Sex.	Wing.	Tarsus.	Culmen.	Nostril.
46267	Wm. Brewster, Cambridge	Codroy, Newfoundland	June 10, 1895	♀	3.74	1.16	.51	.47
46266	" " "	" " "	" " "	♀	3.77	1.13	.50	.40
46265	" " "	" " "	May 30, 1895	♀	3.89	1.10	.47	.36
36524	Comp. Zool., Cambridge	Newport, R. I.	Sept. 25, 1885	♀	3.75	1.15	.47	
1118369	U. S. Nat. Mus.	(Near Spokane) Washington	June 10, 1890	♀	3.71	1.14	.50	.35
10881	" " "	Fort Bridger, Wyoming	May 27, 1858	♀	3.83	1.12	.49	.35
31556	Acad. Nat. Sciences	Kamloops, British Columbia	July 14, 1892	♀	3.79	1.05	.50	.37
31557	" " "	Vernon, British Columbia	Aug. 1, 1892	♀	3.78	1.11	.49	.38
31558	" " "	" " "	" 9, 1892	♀	3.77	1.14	.44	.32
1401	Paul Bartsch, Wash.	Allamakee Co., Iowa	June 28, 1895	♀	3.78	1.15	.50	.35
1402	" " "	" " "	" 27, 1895	♀	3.65	1.18	.47	.31
1589	" " "	Burlington, Iowa	Aug. 29, 1898	♀	3.76	1.19	.50	.35
Totals, average		.	.	.	3.77—	1.13+	.49+	.36+

Coll. No.	Collection.	Locality.	Date.	Sex.	Wing.	Tarsus.	Bill.	
							Culmen.	Nostril.
153	R. H. Howe, Jr., Brookline	Belmont, Mass.	May 23, 1896	♂	3.91	1.09	.50	.35
124	" "	" "	" 20, 1893		4.09	1.16	.49	.35
192	G. C. Shattuck, "	Brookline, "	" 17, 1896		4.05	1.21	.51	.35
36	" "	" "	" 13, 1894		4.10	1.15	.51	.38
8095	Comp. Zool., Cambridge	Cambridge, "	" 22, 1868		3.95	1.19	.52	.40
538	" "	Newtonville, Mass.	" 16, 1868		3.85	1.15	.52	.38
8094	" "	Cambridge, "	" 22, 1868		3.91	1.20	.50	.35
23330	" "	Plainfield, N. J.	" 10, 1872		4.10	1.09	.48	.37
23329	" "	" "	" 10, 1871		3.90	1.10	.50	.38
120	H. V. Greenough, Brookline	Chestnut Hill, Mass.	" 16, 1897		4.09	1.19	.54	.42
118	Bryant, Cambridge	Washington, D. C.	June 20, ?		3.77	1.15	.47	.36
112604	" "	Lynn, Mass.	May 17, ?		3.58	1.08	.48	.38
18818	U. S. Nat. Museum	" "	" 15, ?		3.76	1.11	.49	.37
	" "	Toronto, Canada	Aug. 19, 1887		4.01	1.23	.50	.38
	" "	Steuracke, Nova Scotia			3.77	1.15	.46	.35
Totals, average					3.92+		.49+	.37+
632	R. H. Howe, Jr., Brookline	Brookline, Mass.	May 15, 1898	♀	3.71	1.05	.48	.35
19	R. W. Gray, "	" "	" "	♀	3.91	1.10	.55	.37
8836	H. V. Greenough, "	Chestnut Hill, Mass.	May 27, 1896	♀	3.80	1.16	.49	.38
6764	Comp. Zoo., Cambridge	Newtonville, "	" 25, 1868	♀	3.70	1.19	.47	.35
8096	" "	Brookline, "	" 1851	♀	3.90	1.19	.50	.35
121	" "	Cambridge, "	" 22, 1868	♀	3.65	1.18	.55	.38
	Bryant, Cambridge	" "	" 17, ?	♀	3.79	1.14	.48	.37
119	" "	Lynn, Maine	" 27, 1874	?	3.64	1.16	.50	.35
108	" "	Lynn, Mass.	June 6, ?	♀	3.97	1.18	.50	.38
	G. F. Dippie, Toronto	Toronto, Canada	May 1, 1894	♀	3.98	1.20	.50	.36
Totals, average					3.80+		.50+	.36+

COMPARATIVE MEASUREMENTS.

	♂				♀			
	Wing.	Tarsus.	Bill.		Wing.	Tarsus.	Bill.	
			Culmen	Nostril.			Culmen	Nostril.
<i>H. fuscescens</i>	3.92+	1.15	.49+	.37+	3.80+	1.15+	.50+	.36+
<i>H. f. salicicola</i>	3.94+	1.16+	.49+	.37+	3.77—	1.13+	.49+	.36+

A NEW WREN FROM ALASKA.

BY HARRY C. OBERHOLSER.

THE Wren inhabiting the westernmost islands of the Aleutian group proves, upon examination, to be easily distinguishable from that found from Unalaska eastward and with which it has hitherto been considered identical. The type of *Anorthura alasensis* came from Saint George, one of the Pribilof Islands, and is apparently the same as the Unalaska bird, being certainly different from the form on the western Aleutians; which latter, thus entitled to a new name, may be called

Anorthura meligera, sp. nov.

CHARS. SP. — *Anorthura* *A. alasensis* affinis sed obscurior, multo minus rufescens, corpore posteriore magis distincte fasciato.

Al., 50.5–55.5 (52.9) mm.; caud., 33.5–37 (34.3) mm.; culm. exp., 14–16 (15.1) mm.; tars., 18.5–20 (19.2) mm.

Geographic Distribution. — The westernmost islands of the Aleutian group, Alaska.

Description. — Type, female adult, No. 135647, U. S. Nat. Mus.; Attu Island, Aleutian Islands, Alaska, June 4, 1894; C. H. Townsend. Above sepia brown, reddening somewhat posteriorly, the lower back indistinctly, the rump and superior tail-coverts distinctly barred with blackish; tail prout's, brown, paler exteriorly, barred with blackish; wings fuscous, the secondaries and wing-coverts indented with dull ochraceous, the primaries with buffy; sides of head like the back, mottled with buffy; super-

ciliary streak ill-defined, dull buff; lower parts wood brown, rather deeper and more ochraceous on breast and jugulum, paler on abdomen; crissum and abdomen heavily barred with blackish.

Anorthura meligera seems to be most closely allied to *A. alascensis*, from which, however, it is quite distinct. The generally darker and much less reddish color, particularly above, is perhaps the best character for identification. The rump and upper tail-coverts are more evidently barred; the transverse markings on the abdomen are heavier and extend somewhat farther forward; the wing and the bill average rather longer. In the lack of rufescence above, and in the conspicuous barring of the posterior lower surface the present species resembles *Anorthura pallescens* Ridgway,¹ from the Commander Islands, but is much darker above and much more ochraceous on the anterior under parts. It is thus to some extent intermediate in color between *pallescens* and *alascensis*, as might be expected from its geographical position. The specimens examined are from Attu, Kyska and Atka Islands, and seem practically identical, indicating no intergradation with *A. alascensis*.

The following millimeter measurements are averages of five individuals (four males and one female):

	Wing.	Tail.	Exposed culmen.	Tarsus.	Middle Toe.
<i>Anorthura meligera</i> . . .	52.9	34.3	15.1	19.2	14.
<i>Anorthura alascensis</i> . . .	50.8	34.2	13.7	19.3	13.4

This very interesting addition to the Alaskan avifauna is here described through the kindness of Mr. Robert Ridgway.

NEW SPECIES, ETC., OF AMERICAN BIRDS. — V. COR-
VIDÆ. — (Concluded.)

BY ROBERT RIDGWAY.

Curator of the Division of Birds, U. S. National Museum.

(By permission of the Secretary of the Smithsonian Institution).

Xanthoura yncas galeata, subsp. nov. HELMETED INCA JAY.

Similar to *X. yncas* but larger, and with the erect nasal plumes greatly developed, forming a very conspicuous prefrontal crest; wing averaging 5.00, tail, 6.19, bill from nostril 0.71, tarsus 1.55, middle toe 0.95.¹

Western Colombia. (Type, No. 81879, U. S. Nat. Mus., Colombia.²)

This very easily recognized form has been confounded with both *P. yncas* and *P. y. cyanodorsalis*. It certainly intergrades with the last, as it probably does with the former also, though specimens are wanting from the district necessary to show whether this is the case or not. *P. y. cyanodorsalis* agrees with the present form in the conspicuous frontal crest, but differs in having the hindneck, occiput, and more or less of the crown bright blue, the back also being often strongly washed with blue.

Xanthoura yncas cyanodorsalis (*Dubois*). — This form, although most of the specimens seen, like a majority of those of the preceding, are labelled "Bogota," apparently belongs to the more eastern mountain ranges of Colombia, extending thence into western Venezuela as far as Merida, from which locality the National Museum possesses a specimen.

¹ Five adults; eleven adults of *X. yncas*, from Ecuador, Peru, and Bolivia, average as follows: wing, 4.86, tail, 5.79, bill from nostril 0.65, tarsus, 1.52, middle toe 0.92. Specimens from Peru, however, average decidedly larger than those from Ecuador or Bolivia, but they have the nasal plumes equally short and inconspicuous.

² The type specimen, with others, was part of a collection containing examples of *Cyanolyca armillata quindiana*, and therefore undoubtedly came from the same portion of Colombia as that inhabited by the latter.

Xanthoura yncas chloronota (Wagler). — Although Wagler's description includes two forms (his supposed young male being *X. luxuosa*), the principal description seems clearly to apply to this form only, since the erect frontal plumes, specially mentioned, would exclude the yellow-bellied *P. luxuosa guatemalensis*.

***Xanthoura luxuosa glaucescens*, subsp. nov. RIO GRANDE
GREEN JAY.**

Similar to *X. luxuosa*, but smaller, paler, and duller, with less white on forehead, the back bluish green, more or less (usually extensively) tinged with pale blue; adult male averaging wing 4.46, tail 4.95, culmen 0.98, tarsus 1.48, middle toe 0.82.

Lower Rio Grande Valley.

Type, No. 70593, ♂ ad., Ft. Brown, Texas; Dr. J. C. Merrill, U. S. A.

***Xanthoura luxuosa luxuosa* (Lesson). GREEN JAY.**

This, the central form of the species, inhabits the eastern portion of the Mexican plateau, from the States of Vera Cruz and Puebla north to the middle portion of the States of Tamaulipas (Alta Mira, Victoria, etc.) and Nuevo Leon (Monterey). It is intermediate in characters between *X. l. glaucescens* and *X. l. vivida*, with both of which it of course completely intergrades.

***Xanthoura luxuosa vivida*, subsp. nov. TEHUANTEPEC
GREEN JAY.**

Similar to *X. luxuosa*, but larger and brighter colored, with under tail-coverts yellow or but slightly tinged with green (instead of wholly light green); differing from *X. l. guatemalensis* in being larger, brighter green above, and distinctly light yellowish green below, except on abdomen and under tail-coverts; adult male averaging wing 4.80, tail 5.37, culmen 1.10, tarsus 1.56, middle toe, 0.88.

Southern Mexico (States of Oaxaca, Guerrero?, Michoacan?, north-eastern Colima, Chiapas?) and northwestern Guatemala.

Type, No. 144810, U. S. Nat. Mus. (No. 2585, U. S. Biol. Surv.), ♂ ad., Pluma, Oaxaca, March 20, 1895; Nelson and Goldman.

X nthoura luxuosa guatemalensis (*Bonaparte*). GUATE-
MALA GREEN JAY.

This is a smaller form, with the under parts entirely pure yellow or but slightly tinged with green, and the green of back, etc., rather duller. It inhabits central and eastern Guatemala, Yucatan, and northern Honduras.

Dr. Sclater's argument that the name *X. guatemalensis* of Bonaparte cannot be used for this form because Bonaparte describes his bird as having the under parts pure yellow, will not hold, for the reason that all the Honduras specimens examined (three in number), most of those from Yucatan, and some from Guatemala, have the under parts exactly as pure yellow as in any of the South American forms.

Altogether, considerably more than one hundred specimens have been examined in connection with the preparation of the present paper.

NEW SPECIES, ETC., OF AMERICAN BIRDS.—VI.
FRINGILLIDÆ (Supplement).

BY ROBERT RIDGWAY.

Curator of the Division of Birds, U. S. National Museum.

(By permission of the Secretary of the Smithsonian Institution.)

Melospiza melodia kenaiensis, subsp. nov.

KENAI SONG SPARROW.

Intermediate between *M. m. caurina* and *M. m. insignis*; larger than the former, with upper parts more uniform in color (streaks on back, etc., less distinct); smaller than the latter, with pileum browner and streaks on chest, etc., darker. *Adult male*: Wing, 3.02–3.15 (3.08); tail, 2.84–2.86 (2.85); exposed culmen, 0.52–0.56 (0.54); depth of bill at base, 0.28–0.30 (0.29); tarsus, 1.02; middle toe, 0.73–0.75 (0.74). *Adult female*: Wing, 3.08; tail, 2.97; exposed culmen, 0.55; tarsus, 1.00; middle toe, 0.71.

Coast of Kenai Peninsula, Alaska, from east side of Cook's Inlet to Prince William Sound.

Type, No. 131730, U. S. Nat. Mus., ♂ ad., Port Graham, Cook's Inlet, Alaska, April 9, 1892; C. H. Townsend.

***Passerella iliaca insularis*, subsp. nov. KODIAK FOX
SPARROW.**

Similar to *P. i. unalaschensis* but much browner and more uniform above (back, etc., warm sepia), spots on chest, etc., larger and much deeper brown, and under tail-coverts more strongly tinged with buff.

Kodiak Island (and Middleton Island?), Alaska, in summer; south to California in winter.

Type, No. 52475, U. S. Nat. Mus., ♂ ad., Kodiak, Alaska, May 17, 1868; F. Bischoff.

***Passerella iliaca annectens*, subsp. nov. YAKUTAT FOX
SPARROW.**

Similar to *P. i. insularis* but smaller (the bill especially) and coloration slightly darker; similar to *P. i. townsendi*, but the brown color less castaneous.

Coast of Alaska, from Cross Sound to Prince William Sound (to Cook's Inlet ?); south in winter to California.

Type, No. 170222, U. S. Nat. Mus., Yakutat, Alaska, June, 20, 1899; R. Ridgway.

It is proper to explain that, according to the writer's views, the form called *P. i. unalaschensis* is restricted to the Shumagin Islands and Alaskan peninsula (possibly also parts of the island of Unalashka) in summer. This form is very nearly as gray as *P. i. schistacea*, and closely resembles that subspecies, but has the brown color of the upper tail-coverts and tail decidedly less rufescent and therefore less strongly contrasted with the brownish gray color of back, etc.

The five subspecies of the Pacific coast district, as they appear to me, have breeding ranges as follows:—

Passerella iliaca unalaschensis. Shumagin Islands and Alaskan Peninsula; Unalashka?

Passerella iliaca insularis. Kodiak Island; Middleton Island?

Passerella iliaca annectens. Coast between Cross Sound and Prince William Sound; Kenai Peninsula?

Passerella iliaca townsendi. Coast and islands between Cross Sound and Dixon Entrance.

Passerella iliaca fuliginosa. Coast and islands from southern side of Dixon Entrance to northwestern Washington (Olympic Mts., etc.).

THE CONDITIONS GOVERNING BIRD LIFE IN
ARIZONA.

BY HERBERT BROWN.

THE conditions governing bird life in Arizona are not as elsewhere 'in the States.' This country is but thinly settled, the big towns, particularly, being few and far between. Outside of their immediate vicinity the shot gun practically disappears, and the country man and boy cut but small figure in the increase or decrease of birds. The general aridity of the country is such that vast tracts of land must, perforce, remain forever uninhabited. Cattle interests are, however, a dominant feature in the development of the country, and to these, more than all else combined, must be charged the obliteration of bird life in the so-called desert portions of the Territory.

The stock business at one time promised enormous profits and because of this the country was literally grazed to death. During the years 1892 and 1893 Arizona suffered an almost continuous drouth, and cattle died by the tens of thousands. From 50 to 90 per cent of every herd lay dead on the ranges. The hot sun, dry winds and famishing brutes were fatal as fire to nearly all forms of vegetable life. Even the cactus, although girdled by its millions of spines, was broken down and eaten by cattle in their mad frenzy for food. This destruction of desert herbage drove out or killed off many forms of animal life hitherto common to the great plains and mesa lands of the Territory. Cattle climbed to the tops of the highest mountains and denuded them of every living thing within reach. Often many miles from water and too weak to reach it they perished miserably. I saw, later, what I had never expected to see in Arizona, Mexicans gathering bones on the ranges and shipping them to California for fertilizing purposes. I have thus particularized, for in these dry bones can be read the passing of the Partridge from many a broad mile of the Territory, in fact they practically disappeared from four fifths of the country. When food and protection were abundant these birds were plentiful from the Colorado to the Rio Grande. On the plains and in

the valleys Gambel's Partridges were evermore to be met with, while the Blue or Scaled were almost as common over much of the same country. The Massena, occupying the highest ranges, were, naturally, better protected and thus escaped the general doom. They were, however, never very numerous and soon became exceedingly rare, but when conditions again became favorable they seemed to recover from their losses more readily than did their congeners, and in a few years were again to be found in their old time numbers. Of the Masked Bob-white but little can be said. The few that were then known to exist dropped out of sight altogether and it was not till the spring of last year that I could learn of one being in the country. At that time two small bunches were reported to me, one on the upper Santa Cruz, the other, to my surprise, high up on the eastern slope of the Baboquivari Mountains. Heretofore I had never known them to range higher than the foothills.

Although the cattle industry is slowly recuperating from its great loss it will never again assume its former proportions, for the lessons thus taught will not soon be forgotten. The ranges were foolishly overstocked, and thus many owners of big herds were financially ruined by their covetousness, but under the most favorable circumstances it will be years before the life, once so common to the desert country, recovers from the shock. In the cultivated valleys, and country adjacent thereto, it is again on its feet, but the great reaches of desert are still tenantless. Subsequent to the big drouth I traveled several hundred miles across country and did not see a dozen Quail a day where formerly I had seen hundreds.

The Gambels are a hardy bird and under ordinary conditions multiply rapidly, and, although not susceptible of domestication, increase enormously in the cultivated districts. In 1889 and 1890 there was, so I was informed by the express agent, shipped out of the Salt River valley 3000 dozens. In 1887, I think, the first game law was introduced in the territorial legislature. The bill originated in the Tucson Gun Club, and its purpose was largely the protection of 'Quail,' but so great a pest were the birds regarded by the ranchmen in the Salt River valley that the legislators from Maricopa County threatened to kill the bill unless the

clause protecting 'Quail' was stricken out. They were therefore exempted from its provisions, but two years later the law was amended in their behalf. Under a misapprehension the word 'partridge' had been allowed to stand and prosecutions could have been had under it for the wanton destruction of these birds, but none were instituted as conviction would have been impossible.

The Mohawk valley, in Yuma county, is probably the most prolific breeding spot in the Territory. It was, at one time, a favorite place for trappers and pot-hunters, and it was not until the game law had been amended that their nefarious practices were broken up. In six weeks, in the fall of 1894, no less than 1300 dozens were shipped to San Francisco and other California markets. The price at first realized, so I was told by the shippers, was \$1.12½ per dozen, but later 60 cents only were realized. The Quail were trapped, their throats cut, then sacked and shipped by express. I was told by one of the parties so engaged that he and his partner caught 77 dozens in one day. They used eight traps and baited with barley. Their largest catch in one trap, at one time, was 11 dozens. At the meeting of the next legislature the game law was again amended and it was made a misdemeanor to trap, snare or ship Quail or Partridges from the Territory. This effectually stopped the merciless slaughter of the gamiest bird in Arizona — Gambel's Partridge.

Carolina, White-winged, Inca, and Mexican Ground Doves are all common to southern Arizona. After the drouth, before referred to, these birds increased to large numbers in the cultivated districts, more especially the two former. This was due to no actual increase in the number of birds, but to lack of food elsewhere. They were destroyed by gunners in and out of season. They were, however, included in the amended game law of 1897, and are now protected between the first day of March and the first day of June. Another month is, I think, necessary to see them through the breeding season. The next legislature will be asked to extend the closed season to the first of July.

In a country so widely uninhabited as this it is not possible to particularize much as to other birds, especially the migrants which come and go with each recurrent spring and fall. To many of

them Arizona is but a bridge to reach their breeding and winter grounds, hence they are met with here only as travelers to the north and south. Among the summer residents I cannot say there was any appreciable diminution, but it did noticeably change the nesting habits of several of the larger Thrashers. Heretofore they had chiefly made homes in the different forms of cacti, and when this was broken down and destroyed they occupied the next round on the vegetable ladder — mesquite and palo verde trees and bushes.

THE MOULT OF THE NORTH AMERICAN *TETRAONIDÆ* (QUAILS, PARTRIDGES AND GROUSE).

BY JONATHAN DWIGHT, JR., M. D.

I. Fundamental Principles of Moult and of Plumage.

IN SPITE of all that has been written regarding the plumages of the Grouse and their allies variously known as the Quails, Partridges, Pheasants and Ptarmigans, there still is room for further discussion of the relations that exist between their plumages and their moults, from which standpoint little has hitherto been attempted. From the comparative study of moult in other groups of birds, I am convinced that this is the proper point from which to view the subject in order to comprehend its full significance.

The fact that the plumage of any bird at a given time is simply one of a series following each other during the bird's natural life, is obvious when it is remembered that each new feather grows from the same papilla as the old one. Plumage, which is an assemblage of feathers, would be very simple to understand if all the papillæ were equally active at a period of moult, but as a matter of fact, individual papillæ, as well as whole groups of them, may remain dormant and thus produce the mixed plumages that have been so difficult to understand in many species of birds.

As some feathers, chiefly in young birds, may survive several periods of moult without being renewed, it follows that a recognized stage of plumage may consist of feathers developed at no less than two or three separate periods, and besides this the plumage will be modified by the wear and tear to which it has been exposed. That there is a definite sequence of plumages and of moults is a fundamental fact of the greatest importance and goes far to explain problems of plumage which may be found either among the Grouse or among distantly related birds.

The exact method of moulting in the Tetraonidæ has been understood none too well, and there are some details the significance of which has been quite overlooked. There are nearly forty species and subspecies of these birds distributed among ten genera accredited to North America, and although there is great diversity in relative size and in the patterns and colors of their plumage, they differ little in their moults, which conform quite closely to those of other birds. In an article now in press (*Annals N. Y. Acad. Sci.*, XIII, 1900, pp. 1—, pll. i—vii.), I have shown in considerable detail how the moult of Passerine species is effected, new feathers first appearing at definite central points in the different feather tracts or pteryllæ. The growth of new feathers spreads so that outer rows and extremities of tracts are normally last to be renewed. This systematic replacement, which proceeds so gradually that birds are usually not deprived of power of flight nor of protective feathering, is also apparent in the Grouse and Quails, due allowance being made for differences of pterylosis. These differences have been so exhaustively treated in a recent paper by Mr. Hubert M. Clark (*Proc. U. S. Nat. Mus.*, XXI, 1898, pp. 641—653, pll. xlvii—xlix) that I need say nothing more upon the subject except later on to designate briefly the points at which new growth begins and the areas over which it spreads at different periods of moult.

In my earlier study of Passerine species, extending over a number of years, I reached conclusions that have enabled me to formulate some fundamental principles governing plumage and moult which my later study of the Tetraonidæ and other groups bears out in every particular. As the application of these principles will explain every plumage and every moult, I present them here before going farther. They are as follows:—

I. Every species has a definite sequence of plumages and of moults.

II. Moult is periodical systematic feather growth.

III. Moult is complete or incomplete.

IV. Plumage is renewed by moult.

V. Plumage is modified by wear.

A word has already been said about each species having a definite series of plumages and of moults. This is found to be true of every species of Grouse and every species of Quail, plumage being renewed by feather-growth at definite periods while between them it is subjected to all the destructive influences of abrasion and fading which I have summed up under the word wear. It has been possible for me to reach these conclusions by an examination of the large series of Tetraonidæ in the American Museum of Natural History, thanks to the kindness of the Curator of Zoölogy, Dr. J. A. Allen, who has afforded me every facility. I must confess that the study of moult from museum skins presents many difficulties. The loss of feathers from the birds when fresh and the crowding together of parts of the skin, especially of the wings, obliterates many details or renders their demonstration impossible without serious mutilation of the specimens when once dried. Fortunately a few specimens of *Colinus*, *Dendragapus* and *Bonasa* in my own collection were studied before they were skinned so that I am able in a measure to make up the serious shortcomings of dried skins.

Before taking up the Grouse and Quails individually it will be well first to consider their moults in general and then discuss their plumages, the same fundamental principles being applicable to all of them.

Among the Tetraonidæ two distinct periods of moult may be recognized in adults and two others in young birds occurring shortly after they leave the nest. The one which occurs in adults at the end of the breeding season is complete, just as it is in all species of North American birds, and is known as the Postnuptial Moult; the other, which is seldom complete in any species and in the Tetraonidæ chiefly confined to a very limited area of the head and throat, is known as the Prenuptial Moult. In the Quails the prenuptial moult includes very little beyond the sides of the head

and the black, white or brown chin area, as the case may be, while in females the renewal is still more restricted or even suppressed. In the Grouse, I can find little satisfactory evidence of prenuptial moult beyond the growth of a few feathers about the chin, except in *Lagopus*, which has the most extensive renewal of any of the Quails or the Grouse. It is extremely easy to overlook an incomplete and restricted prenuptial moult, for all members of the family being game-birds, they are protected by law during most of the year and very few specimens taken at or just after this period of moult have found their way into collections. There is, however, unquestionable evidence, that this moult takes place in several species during April and May, and probably it is characteristic of all of them.

Lagopus alone is peculiar in having an extra or supplementary postnuptial moult. The conditions of life under which this Arctic bird lives perhaps necessitates this extra moult, which is not, however, confined to this genus but appears to be a regular feature in the moult of certain Anatidæ. It is a true moult involving the brown or dusky portion of the plumage already wholly renewed by the regular and complete postnuptial. It will be discussed more fully later.

Adults, then, have two periods of moult in most if not all of the species, while young birds also have two periods of moult, one when they doff the downy plumage in which they leave the egg, the Postnatal Moult, the other when they assume winter plumage, the Postjuvenal Moult. All species of Grouse and Quails at the latter moult assume a plumage scarcely distinguishable from that of the adult. This is true in a large measure even of *Lagopus* but here again we find an extra moult supplementary to the postjuvenal, and, as in the adult, limited in extent.

In speaking of moult the idea of periodicity must be borne in mind. New growth which occurs at any time when one or more feathers are torn out is simply an accident. At every period of moult feather growth begins at definite points and spreads systematically from them. This is what always happens at any one of the series of moults peculiar to each species. If the moult be incomplete, the new growth ceases before it has spread to its usual limits, and very often stray feathers in its path are left over

until another period. There are all degrees of suppression in the extent of the areas involved by a moult which is partial, like the prenuptial, and females always renew more limited areas than do the males. The postnuptial moult seldom leaves a trace of the old plumage, nor as a rule do the complete moults of young birds of any species to whatever family they may belong.

A table that I prepared to show the relations existing between plumages and moults among Passerine species is with slight modification applicable to the Grouse and Quails. It is as follows:

<i>Plumages.</i>	<i>Moults.</i>
1. Natal	Postnatal
2. Juvenal	Postjuvenal
3. First Winter	First Prenuptial
4. First Nuptial	First Postnuptial
5. Second Winter (adult)	Second Prenuptial (adult)
6. Second Nuptial (adult)	Second Postnuptial (adult)
etc., etc.,	etc., etc.

This scheme distinguishes a series of plumages followed by moults which may be complete, partial, or even suppressed according to species, age, sex and individual. It permits of a plumage being called adult whenever evidences of immaturity are lost, and it is applicable to the Tetraonidæ by recognizing, in the exceptional case of *Lagopus*, the supplementary postjuvenal and postnuptial moults which produce the white supplementary winter plumage. In all the other Grouse and their allies the scheme is without exception, save the probability that the prenuptial moult is suppressed in some of them. More material must be examined to determine this, for as the feathers of these birds suffer comparatively little wear, owing to their structure, it is easy to overlook a prenuptial moult limited to a few feathers about the head.

A better understanding of the development of the different plumages at the periods of moult will be gained by taking each up in the order in which it appears:—

1. *Natal Down*.—The early history of this first stage of plumage must be sought within the egg, but we need only begin at the time when the chick emerges from the shell. The young of all the Tetraonidæ are densely covered at this stage with a downy plumage. Upon the individual feathers of this down,

which among other birds varies in structure according to family, several names have been bestowed, one of the latest being neosoptile, in contradistinction to teleoptile, the name applicable to every later feather (see Gadow, *Newton's Dictionary of Birds*, 1893, p. 243), although Mr. Wm. Palmer proposes the name mesoptile for the first feather which succeeds to the neosoptile. (See *Fur Seals and Fur Seal Islands of the North Pacific Ocean*, 1899, part III, p. 424.) The structure of the natal down resembles that of the barbs or rami of the succeeding feathers with which its filaments are continuous, being gathered into bundles at the apices of the new feathers. All the Grouse and Quails at this stage are very similar, being everywhere yellowish or grayish and immaculate below, and mottled on the back and head with various shades of chestnut and black, with a dusky mark behind the eye. There is a sort of a ruff on the nape, and in species which later have a crest, a tuft of longer down may mark the spot where it will appear. The chicks run about almost as soon as they are hatched, and within a few days begin to show signs of the succeeding plumage, which is rapidly assumed by a complete post-natal moult. It is of the utmost importance to follow the development of this second plumage, to which I have given the name juvenal.

2. *Juvenal Plumage.*—The first signs of this second stage (the feathers of which have been called mesoptiles and differ in structure from the teleoptiles of adults) will be found near the middle of each wing, where the remiges and their coverts appear extending in both directions from the carpus so that the distal and the proximal members of the series are latest in their development. It is well to notice here that in all subsequent moults involving the wings the progress of the moult corresponds approximately in matter of time to the order of development here indicated. The first tract to show any moult is usually the alar, beginning with the proximal primary (always the tenth among the Grouse and Quails), the moult proceeding distally, until about four primaries have fallen out when it proceeds proximally towards the body. The Tetraonidæ have one striking characteristic that seems to have been generally overlooked. The two distal primaries do not develop until the rest of the series of remiges (except the

innermost secondaries) is well developed, and their growth is so slow that the primary adjacent (the third) is often free of the persistent scale-like sheath, the remains of its follicle, before the quills of these two feathers have lost their pulpy look. In consequence of this, the postjuvenal moult, beginning with the loss of the tenth primary often before they are grown, reaches them in some cases before they have lost their signs of immaturity. They are not moulted, but retained for a twelvemonth, while the rest of the remiges are renewed by the postjuvenal moult. The distal pairs of primaries therefore belong to the juvenal plumage, while the rest are truly a part of the first winter dress. This peculiarity is not at all striking among the brown-quilled species, but in *Lagopus* it has doubtless occasioned some of the misunderstandings that have prevailed regarding the moult of the Ptarmigans. In these birds the two distal primaries are white when first developed, while the rest of the remiges are brown until renewed by white ones at the postjuvenal moult.

The next point at which new feather growth begins in the chick is on either side of the breast, spreading backwards along the sides, and a little later new feathers appear on the back at the root of the neck, upon the middle of the crown, and at the middle part of the humeral and femoral tracts. The tendency is to spread backwards with new points of departure anteriorly on the forehead, throat, chin and sides of the head, and posteriorly on the rump, flanks and abdomen. The wing-coverts reach their full development in advance of the remiges and before the body plumage, the greater and lesser in advance of the median, and the upper coverts before the lower. The chin and throat, sides of the head, neck, mid-abdomen and tarsi are late in losing the downy plumage and the rectrices are also late in their development. The same relative order of renewal is observable in later moults, plumage being renewed in very nearly the same order in which it originally grew. Renewal is very systematic in birds and if certain feathers of a tract or of a series have already been moulted, it is not difficult to predict when and where the next feather will have its place taken by a new one, provided the laws which govern moult, the distribution of the feather tracts and the peculiarities of species under consideration are known.

It is almost impossible to assign a time for the acquisition of the juvenal plumage. Birds about one third grown will still have downy chins, foreheads and abdomen and the tail barely showing, while the plumage elsewhere is well developed, except the opposite ends of the row of remiges, where the quills are only partly grown. At about this time, the first signs of the postjuvenal moult may be found in the replacement of the tenth primary by a new one, the first of the winter plumage. This moult may involve five or six primaries before it is noticeable upon the body at either side of the breast. Birds are about one half grown when this point of development is reached, perhaps three weeks or so old.

The tendency is for the juvenal plumage to resemble somewhat that of the adult female, the sexes, as a rule, not being certainly distinguishable, both wearing, for instance in the crested species, a crest that is usually brown, which in the adult would be black. All colors are apt to be duller than those of the next plumage, more uniformly colored, sometimes slightly barred or mottled feathers preceding the rich tints of the winter dress, which is practically alike in the young and old of nearly all species.

3. *First Winter Plumage.*—This third stage is reached by a postjuvenal moult which is complete except for the retention of the two distal primaries of each wing, and the plumage assumed is scarcely to be distinguished in any of the species from that of the adults in winter plumage. The completeness of the postjuvenal moult and the early acquisition of adult plumage simplifies all questions of plumage except in the Ptarmigans. They, however, assume a dress which is white except upon the head, throat, outer part of the sides and the back. The supplementary postjuvenal moult peculiar to them follows quickly and involves only the feathers of the dark areas. As the postjuvenal itself is scarcely complete before the supplementary one begins, it is not surprising that a plumage made up of feathers of three different periods of growth should have given rise to much discussion in explanation of the phases of dress through which these birds pass, there being a preliminary and a supplementary stage of the winter plumage. The difficulty is to draw the line between the different stages of plumage which, especially in the young bird, almost insensibly blend one into the other.

Any autumn bird that shows remains of the follicles about the two distal primaries and one or two mature feathers intervening between them and newly developed primaries further on in the series may always be set down as a young bird. In the adult the moult proceeds uniformly from the tenth to the first, so that if the two distal show immaturity and the remainder are all fully grown, the bird may be set down as an adult. This is true of all the Quails and all the Grouse.

The first winter plumage assumed, according to species, during September, October and November, is worn until the following April or May and in the case of the Ptarmigans of northern latitudes even into June, when either a prenuptial moult of limited extent takes place or a bird may be said to have passed into first nuptial plumage without moult, and by wear alone.

4. *First Nuptial Plumage.*—This is a fourth stage which is chiefly the first winter plumage plus an inconspicuous amount of wear, but a limited prenuptial moult renews a small part of the old plumage. The Quails and Grouse, most of them, assume new feathers limited to the throat patch of white, black or buff, which come in of very nearly the same color and pattern as the old, and to the sides of the head and forehead. The Ptarmigans assume dark feathers over larger areas, only the wings, tail, abdomen and flanks remaining white, but the individual variation is considerable.

This dress is commonly known as the breeding plumage. Just as soon as a pair of birds have started their brood in life, they undergo the first postnuptial moult, the male beginning the process in advance of the female. The Arctic Ptarmigans may begin early in July, the Grouse and the Quails usually in August or perhaps September, in some cases. This moult is invariably complete with the possible exception of a few feathers, and the slight differences between old and young which may have persisted up to this period are now practically obliterated and all subsequent plumages may be called adult. The year old Ptarmigans, like the birds of the previous autumn, assume a plumage reddish or dusky over the superior and anterior regions of the body, and a supplementary first postnuptial moult takes place by which the dark areas are renewed by white.

5. *Second or Adult Winter Plumage.*—As I have just pointed

out, this fifth stage is reached through the first postnuptial moult, the Ptarmigans alone assuming a supplementary winter dress by an extra moult of limited extent. Differences of plumage between young and old now wholly vanish, except that at later moults, with age, colors are supposed to deepen, but the actual age of a bird becomes a matter of conjecture. Birds in this dress can be told from birds of the year by osteological and histological characters, but there is often nothing characteristic in their plumage.

6. *Second or Adult Nuptial Plumage.*—Like the first nuptial this plumage may be only that of the winter plus wear (as it is in many females) or it may be partly renewed by an incomplete prenuptial moult confined to insignificant areas about the head, or, in the case of the Ptarmigans, extending over larger areas. It may be distinguished from the first nuptial in a very few cases only and passes into that of the third winter by a complete postnuptial moult.

So it is that plumages and moults will follow each other during the lifetime of a bird and a full comprehension of the systematic and harmonious workings of natural fundamental laws will go far towards dispelling the hazy ideas that have prevailed regarding both plumage and moult.

II. *Moult of the Individual Species.*

Colinus virginianus (Linn.). BOB-WHITE.

Natal Down.—Above chiefly chestnut, buff on sides of head with black streak behind the eye. Below grayish buff, palest on chin, browner on the sides. There is a dearth of specimens showing the transition into the next plumage.

Juvenal Plumage, acquired by a complete postjuvenal moult. Above dull brown, the feathers with white shaft-lines widening at the tip, the feathers of the nape and back with terminal black spots on the inner webs; crown dusky, gray laterally without shaft-lines, rump pale brown with faint whitish edgings. Wings and tail dull mouse gray with pale buff-mottled edgings on the primaries, whitish mottling on the rectrices; the secondaries and

their coverts a dull reddish brown indistinctly barred with buff bordered with dull black, the inner members black terminally edged with rich buff. Below dull gray on throat, breast and sides, the feathers with white shaft-streaks, the abdomen dull white and the chin clear white bordered posteriorly with the dusky tipped buff feathers of a throat band. Broad line below eye dull black, lores and superciliary stripe dull white or buff. Males are apt to be richer colored than are females and with grayer tails, whiter chins, blacker throat bands and often a slight dusky barring on the breast. A half dozen birds in my own collection show the change into first winter dress. No. 883, ♂, Connecticut, Oct. 22, and No. 2044, ♀, Connecticut, Oct. 5, have not yet entirely lost the natal down of the chin. They have recently lost the tenth and ninth primaries, the new ones of the winter dress being mere pin points. In neither of them have the two distal primaries pushed much beyond their follicles and in No. 2044 the third has barely reached its full development; otherwise they are in full juvenal dress. Nos. 2041, ♂, 2042, ♂, and 2043, ♀, Connecticut, Oct. 5, are further advanced, still having the white throats of the juvenal but with four primaries and a few body feathers of the winter dress. No. 6236, ♀?, New York, Oct. 21, and No. 6759, ♂, New York, Oct. 17, are still further advanced, the only remaining remiges of the juvenal dress being the second, third and fourth and the sixteenth to the twenty-fourth, together with the distal pair, as yet not fully grown. The winter plumage is coming in at the usual points on the body.

First Winter Plumage, acquired by a complete postjuvenal moult excepting the distal pairs of primaries of each wing. Young birds and old become practically indistinguishable although the young bird tends to less barring below and the white has a buff tinge, the colors above being duller with paler edgings. In the male the white juvenal chin is replaced by a purer white, in the female by a rich buff, the sexes now being distinctly differentiated for the first time. I have several specimens in my collection completing the postjuvenal moult. No. 860, ♀, Connecticut, Oct. 10, is in full winter body plumage, the first and second primaries show no evidences of growth, the third is old and the fourth a mere pin point, the fifth nearly grown and the rest of

the series new. They differ from the juvenal quills in being edged with pinkish buff; the rectrices, largely grown, are clear gray with little or none of the white mottling of the juvenal dress. No. 6262, ♀, New York, November 4, is at about the same stage of development, the tail and chin rather less advanced. It is hardly necessary to cite specifically other specimens, as the changes I have indicated are perfectly demonstrated by those already referred to by number.

First Nuptial Plumage.— This is evidently acquired by a very limited or incomplete prenuptial moult occurring in May. New feathers of the same color and pattern as the old grow upon the white chin, including its black border, and upon the sides of the head and the forehead. Birds taken at the right season to show this are extremely rare in collections, as it is contrary to law to shoot game birds out of season. There are three specimens, however (Amer. Mus. Nos. 25876, ♂, and 26493, ♀, Pennsylvania, May, and No. 55354, ♂, South Carolina, June 4), showing new growth, which is doubtless of regular occurrence.

Second or Adult Winter Plumage, acquired by a complete post-nuptial moult chiefly in September. A male in my collection, No. 2040, Connecticut, Oct. 5, is in nearly full winter plumage, the three outer primaries old and worn, the fourth only about one half grown, while the rectrices and some feathers of the chin are not yet fully developed.

Second or Adult Nuptial Plumage, acquired by a partial prenuptial moult, as in the young bird. It is hardly necessary to refer to this and later plumages, which are simply repetitions of each other, one for summer and one for winter. Wear is not an important factor and produces no appreciable effect upon the plumage, most of which is worn for an entire year.

***Colinus virginianus floridanus* (Coues). FLORIDA BOB-WHITE.**

The plumages and moults are like those of *virginianus*, the prenuptial moult occurring somewhat earlier in the season. Most of the specimens I have seen are winter birds, taken not later than March, before the prenuptial moult would be expected to occur. However, a male from Nassau, Bahama Islands (Amer.

Mus. No. 35471, March 22) shows considerable renewal about the forehead, sides of head, chin, and jugulum, and several Florida birds in Mr. Sennett's collection show new growth in April and May.

***Colinus virginianus texanus* (Lawr.). TEXAN BOB-WHITE.**

The plumages and moults evidently correspond to those of *virginianus*. Two males taken at Corpus Christi, Texas (Amer. Mus. Nat. Hist., No. 55001, April 22, and No. 55002, April 24) both show new feathers growing about the chin and head and a number of specimens in the collection of Mr. George B. Sennett show a prenuptial moult, extending from March into May. The juvenal plumage is browner than in *virginianus*.

***Colinus ridgwayi* Brewster. MASKED BOB-WHITE.**

The material examined is not sufficient to enable me to reach any positive conclusions. The ruddy breast and black throat are evidently assumed at the postjuvenal moult.

***Oreortyx pictus* (Dougl.). MOUNTAIN PARTRIDGE.**

“ “ ***plumiferus* (Gould).** PLUMED PARTRIDGE.
“ “ ***confinis* Anthony.** SAN PEDRO PARTRIDGE.

The material I have examined is limited but conclusive, showing the different stages occurring as follows:

Natal Down.—A broad stripe of rich chestnut runs from the forehead to the tail bordered on either side by narrow pale buff stripes, the sides and wings being mottled with dusky chestnut; a dark line behind the eye. Below uniform yellowish white, palest on the chin and buff on the sides of the head. A specimen of *pictus* in my collection (No. 4947, Oregon, May 27) has the middle members of the remiges just developing with the tuft of natal down at their apices. The distal pairs are not in view. Another bird representing *plumiferus* (No. 3897, ♀, Fresno County, California, August 4) is more advanced though still a mere chick and retaining natal down on head and throat.

Juvenal Plumage, acquired by a complete postnatal moult.

Above grayish brown with dark markings and dull white speckling, the neck and head clear gray with a little white speckling; crest dull brown with indistinct buff barring. Below gray with whitish edgings, chin chiefly white, the flanks and crissum chestnut tinged. Sexes practically alike. Two birds in my collection, No. 3895, ♂, Tacumba Valley, California, July 4, and No. 3896, ♀, San Gabriel Mts., California, Aug. 4, have assumed a few body feathers of the first winter dress. In neither are the two distal primaries fully developed while the postjuvenal moult has advanced from the tenth to the sixth. The rich brown feathers of the winter dress have begun to appear on the flanks, their origin being the sides of the breast.

First Winter Plumage, acquired by a complete postjuvenal moult, except the distal pairs of primaries. Birds become practically indistinguishable from adults and the females not very different from the males but with duller colors and smaller, browner crests.

First Nuptial Plumage. — The material examined does not show whether a prenuptial moult takes place or not. It probably does and is limited to the head as in the other Partridges.

Later plumages are but repetitions of the last two.

Callipepla squamata (Vig.). SCALED PARTRIDGE.

“ “ **castanogastris (Brewst.). CHESTNUT-BELLIED SCALED PARTRIDGE.**

I have examined about 150 specimens of these two forms, which show the plumages and moults at nearly all stages. Fading is more apparent than in any of the Quails.

Natal Down. — Several specimens have partly assumed the juvenal dress but the down of the head and throat indicates a brown dress mottled above and whitish below.

Juvenal Plumage, acquired by a complete postnatal moult. Above similar to *C. californica* but paler and more streaked, below grayer mottled with dull white. Numerous specimens show the change into the next plumage.

First Winter Plumage, acquired by a complete postjuvenal moult, excepting the two outer primaries, as is usual in this

family. Young and old become indistinguishable and males and females may now be told apart by the plumage for the first time.

First Nuptial Plumage, acquired by an incomplete prenuptial moult restricted to the head and throat, an occasional new feather showing elsewhere. There are a number of birds of both sexes with new feather growth apparent in April and May.

Second or Adult Winter Plumage, acquired by a complete post-nuptial moult which is well illustrated by specimens; a male from Arizona (Am. Mus. No. 56526, August 15) has renewed seven primaries and eight secondaries, together with half grown median rectrices, and much of the body plumage except part of breast, nape, head, throat and chin and some of the back and rump; two females from the same locality (Am. Mus. No. 56527, Aug. 26, and No. 56529, Sept. 6) are both less advanced, only the ninth and tenth primaries being new. Later plumages and moults are repetitions of earlier ones.

Callipepla californica (*Shaw*). CALIFORNIA PARTRIDGE.

“ “ **vallicola** *Ridg.* VALLEY PARTRIDGE.

The two forms of this bird are fairly represented by specimens I have examined.

Downy Plumage.—Above, rich brown, mottled on the sides with dusky brown; a dark line behind the eye. Below, dull white somewhat tinged with buff. The form *vallicola* is possibly grayer at this stage. The chicks are not very obviously different from those of *Oreortyx*.

* *Juvenal Plumage*, acquired by a complete postnatal moult. Above grayish brown with dusky and whitish edgings on the back and wing-coverts; nape gray with faint whitish shaft-streaks and dusky edgings. Below, gray with whitish edgings, producing a barred effect. A California bird (Amer. Mus. No. 61062, ♀, July 3) still retains the downy head, the first or distal primary is a mere pin feather, the second is half grown, the third and fourth show remains of their follicles, and the rest are grown except the inner members of the series. A female (Amer. Mus. No. 61063,

July 3) is much farther advanced, the chin being clothed, the under wing-coverts replacing the down, the dusky chestnut crest appearing, and the renewal of the remiges by the postjuvenile moult has involved the sixth to the fifteenth of the remiges.

First Winter Plumage, acquired by a complete postjuvenile moult, excepting the two distal primaries. Young birds are now scarcely distinguishable from adults, the colors, however, are not so deep.

First Nuptial Plumage, acquired by a partial prenuptial moult, limited to the fore parts of the head and throat. Several California specimens, male and female, illustrate this (Am. Mus. No. 61053, ♂, May 7, No. 61055, ♂, May 9, No. 61058, ♂, May 20, and No. 61059, ♀, May 23).

Later plumages are only repetitions of winter and summer dress.

Callipepla gambeli (Gambel). GAMBEL'S PARTRIDGE.

A fine series of about 150 specimens examined illustrates all the plumages and moults of this species.

Natal Down.—Very similar to *Callipepla californica*. Above, the crown is pale brown bordered by pale buff lateral stripes, the back nearly black and a dusky line behind the eye. Below, dull white, sides of head and an indistinct collar buff. A chick (Amer. Mus. No. 51426, Arizona, June 6) shows eight of the ten primaries just breaking from their follicles, most of the secondaries being at a similar stage of development.

Juvenile Plumage, acquired by a complete postnatal moult. Until the plumage of the nape appears the birds are almost indistinguishable from *Callipepla californica*. This region is then uniformly gray with more distinct shaft-streaks and no dusky borders as in *californica*. A number of specimens show different stages of this plumage. Two especially (Amer. Mus. No. 29619, ♂, Arizona, July 9, and No. 51413, ♀, July 12) show the juvenile plumage well advanced and the postjuvenile moult, beginning with the tenth primary before the first and second are nearly grown.

First Winter Plumage, acquired by a complete postjuvenile moult, excepting the two distal primaries. Young and old become

indistinguishable, males assuming the black throat and crest, females the browner dress. A male (Amer. Mus. No. 29637, Arizona, October 11) is acquiring a few black feathers of the chin patch and the chestnut feathers of the flanks, while the postjuvenile moult in the wing has reached the sixth primary, the two distal still retaining their follicles. A female (Amer. Mus. No. 29634, Arizona, October 9) is largely in first winter plumage, the only old feathers of the remiges being the third and the three proximal; a new blue-gray tail has replaced the mottled one of the juvenile plumage.

First Nuptial Plumage, acquired by a partial prenuptial moult limited to the anterior parts of the head and throat. Numerous specimens illustrate it. The black throat and its white border are renewed by feathers of the same color. The moult appears to take place in Arizona towards the end of April.

Second or Adult Winter Plumage, acquired by a complete post-nuptial moult.

Later plumages are like those already described.

Cyrtonyx montezumæ (Vig.). MASSENA PARTRIDGE.

A fine series of twenty-seven specimens illustrates well the different plumages, especially of the young bird.

Natal Down.—Above chestnut or rusty brown, in the median line, mottled with dull black and bordered with buff; a dusky line behind the eye. Below dull white, palest on the chin.

Juvenile Plumage, acquired by a complete postnatal moult. Both sexes now resemble the adult female, being streaked, but without the pinkish tint of the back and are black-spotted below with white shaft-streaks. A male (Amer. Mus. No. 58934, Arizona, September 12) still shows down on the throat and sides of the head. The juvenile rectrices are partly grown, the primaries are pulpy, the distal pair not yet visible, and the inner secondaries are still only partly developed. A female (Amer. Mus. No. 56536, Mexico, October 12) has assumed the dull white throat of the juvenile dress and shows the postjuvenile moult, which has already involved the seventh to the thirteenth of the remiges; the distal pair are not yet fully grown. Several other specimens show

the transition into first winter plumage (Amer. Mus. No. 29612, ♀, Arizona, Nov. 1; No. 56538, ♂, Mexico, Sept. 19, and others).

First Winter Plumage, acquired by a complete postjuvenile moult excepting the two distal primaries.

One male is in nearly full plumage (Amer. Mus. No. 35225, Arizona, November 20), the first and second primaries full grown, the third one half and the remainder of the series new except one or two of the proximal secondaries. Males assume the rich and beautiful plumage of the adult, now first being distinctly differentiated from the females which are streaked and spotted and decidedly pinkish.

First Nuptial Plumage.—There is a limited prenuptial moult as shown by specimens in Mr. Geo. B. Sennett's series.

Subsequent plumages are only repetitions of those already described.

(To be concluded.)

REPORT OF THE A. O. U. COMMITTEE ON PROTECTION OF NORTH AMERICAN BIRDS.

THE YEAR just passed has been a most important one to those interested in the furthering of bird protection, particularly to the members of your Committee.

During the years 1896 and 1897, largely through the personal efforts of Mr. Wm. Dutcher, then chairman of this Committee, the cause of bird protection was brought prominently before women's clubs and similar organizations in all parts of the country, with a view to arousing a general interest in the subject and bringing it to the attention of the general public. The success which attended these efforts was shown in Mr. Dutcher's reports and in the voluminous correspondence of your Committee during the year covered by our last report. Audubon Societies, organized for bird protection and the encouragement of bird study, have sprung up on every hand, and nearly every

person in touch with the public press is to-day acquainted with the movement for the protection of wild birds and their exclusion from millinery. The matter has also extended to the schools with most encouraging results.

While we cannot expect immediate success in all our efforts for bird protection, the arousal and extension of this sentiment will ultimately accomplish the desired end, and even to-day so widespread is the interest in wild bird life that no serious outrage can be perpetrated without arousing a host of protests.

So rapid had been the growth of the Audubon Societies, and so great the demand upon your Committee, that we recommended in the last report the establishment of a magazine which should be the organ of these societies and serve as a means of keeping the immense membership in touch with their work. The idea was realized almost at once by the appearance of 'Bird-Lore,' ably edited by Frank M. Chapman, which has fully justified the highest expectations of its advocates. The Audubon Society department, under the direction of Mrs. Mabel Osgood Wright, serves to unite these organizations and forms, as it were, a central bureau of information upon this line of work. This relieves your Committee of a great burden of correspondence which it must soon have been quite unable to attend to, and permits it to turn its attention to general matters which belong more strictly to its scope.

We may therefore refer those interested in the Audubon Societies to the pages of 'Bird-Lore,' merely saying that these organizations have continued to increase both in influence and membership, and that since our last report additional State Societies have been established in Tennessee, Texas, and California.

The establishment of a central publication office for Audubon Society literature is still as much desired as ever; but unfortunately no serious attempt has as yet been made in this direction. The inclination seems stronger than ever and we trust that some definite steps will be taken at an early date.

Probably at no time since the organization of the Audubon Societies has there been such a general use of birds in millinery as during the present winter, which is another evidence of the difficulty of common sense producing any effect upon fashion. Nevertheless the protest against birds in millinery was never so

strong, especially among the rising generation, and the growing feeling on all sides that it is vulgar and in bad taste to wear birds, will inevitably make the present fashion one of short duration. Notwithstanding this, however, efforts are being constantly made by dealers to obtain birds from various parts of this country, especially where it can be done without breaking the laws.

Information has reached your Committee of large quantities of Grebe breasts collected in western America, and of offers which have been made to fishermen along the New England coast to enlist their services in collecting Terns.

The recent demand for single quills has resulted in the slaughter of innumerable Hawks, Owls, Eagles, and Pelicans, and now the demand is largely supplied from the Turkey Vulture, one of the most useful and at the same time most disgusting birds that we have.

Mr. Wm. Palmer of our Committee writes me that numbers of these birds are trapped not far from Washington, D. C. They are decoyed with the carcasses of dead animals, and caught in a barrel arranged in such a way that when a Vulture alights on the side he is precipitated into it. The quills are then pulled out and the bird allowed to run. In many cases so many feathers are taken that the bird is unable to fly and probably dies.

These instances of collecting for the millinery trade in our own country serve to emphasize the need of more stringent laws for the protection of birds, and their strict enforcement. This seems to be the only means of checking the millinery collectors.

The old stories that plume hunters do not use guns but collect Egret plumes which have been cast off by the birds, and that in certain remote parts of the world Egrets are actually farmed(!) have been recently revived and published in journals where they have attracted widespread attention, and seriously hindered the work of the Audubon Societies. We need only say that there is no foundation for either statement. Any ornithologist who knows the habits of the Egret or any person who has visited their haunts will testify to the absurdity of these stories.

During the past year your chairman has taken up another matter of great importance, the question of excessive collecting of birds, and more especially of eggs, for alleged scientific purposes.

Without wishing to object in the slightest to the collecting of such specimens as are needed for scientific purposes, or for even small collections as assistance to field work, a protest was made in the last annual report against excessive collecting as a business, or on the part of those who collect merely for the sake of having a large collection, and contribute little or nothing to our knowledge of birds. For the benefit of young bird students, who are often influenced by dealers in their ideas of what constitutes ornithology, a circular was prepared on the above lines in which were combined the opinions of the ornithologists of all the larger scientific institutions of the East. Ten thousand of these were published, with the generous assistance of the Pennsylvania Audubon Society, and distributed in all parts of the country. This circular, and the stand taken by your committee, has been endorsed by all the ornithological journals of America, and ornithologists generally, and its beneficial effect is already in evidence.

From the reports of the various members of your committee for the past year, I quote the following:—

Mr. Dutcher of our committee reports that he endeavored to proceed against dealers in native cage birds in New York City, but failed, owing to the impossibility to prove that the birds were actually trapped in New York, the dealers claiming that they were secured in Florida.

Mrs. Robins reports great success in interesting constables in the enforcement of the game and bird laws. In many States it is possible to have constables appointed as special game wardens, and if the matter is properly explained to them, the pecuniary benefits are quite sufficient inducement to enlist their assistance in the cause of bird protection. True sportsmen do not break game or bird laws, and the punishment of a few promiscuous shooters will soon suppress an objectionable class.

Mrs. Olive Thorne Miller reports increasing interest in popular bird study in every part of the country that she has visited, and in many schools where the children are specially instructed in observing wild birds.

Miss Florence A. Merriam especially emphasizes this last fact, and considers the instruction of teachers in the rudiments of popular ornithology a most important work.

Dr. T. S. Palmer reports the enactment of a new game law in the District of Columbia, March 3, 1899, which increased the penalty for killing insectivorous birds, and provided for the inspection of cold storage rooms under certain restrictions. He also reports the successful organization of classes for ornithological instruction among the school teachers of Washington, which were conducted by himself and Mr. H. C. Oberholser, with the coöperation of Prof. Wm. B. Powell, superintendent of schools. The Biological Survey has also done most valuable educational work in the distribution of papers and circulars on Economic Ornithology.

Mr. A. W. Anthony reports that a recent visit to Magdalena Bay, Lower California, shows the almost total destruction of the Herons by plume hunters and native Indians. This work was begun some four years ago, as previously reported, and the encouragement of plume collecting among the Indians has proved most disastrous. Mr. Anthony reports that the extensive sheep grazing in Plumas County, Cal., and elsewhere on the Sierra Nevada, seems to result in the extermination of the Sooty Grouse, Plumed Partridge, and other ground birds, as the sheep trample both young and nests under foot. Furthermore, the sheep-herders burn the underbrush over large tracts, and thus work great havoc on the birds. Though this is against the law, it is almost impossible to prevent it for lack of definite evidence.

This instance is quite parallel to the destruction by fire of vast tracts of lumbered regions or bark peelings in the forests of Pennsylvania and other States, and the almost total destruction of the forest-loving birds which formerly abounded there and would doubtless remain were the tracts allowed to grow up properly protected from fire.

Visits to the Pennsylvania lumber regions during 1898 and 1899 deeply impressed your chairman with the importance of the work of the Forestry Commissions and its close association with the question of bird protection.

Mrs. Stevenson reports that during the past winter, when an unusual influx of Robins occurred in Arkansas, the gunners turned out in numbers, and though many birds were killed the first day, the arrest and conviction of a dozen or so of the would-be

'sportsmen' completely checked the slaughter in the vicinity of Helena.

In Washington, D. C., Dr. T. S. Palmer reports the arrest of one of the principal game-dealers for selling Robins, which has resulted in stopping the traffic in that city to a great extent.

Mr. Geo. H. Mackay, although resigned from the Committee, has continued his excellent work in the interests of bird protection in Massachusetts, both in looking after the Terns on the islands and in legislative work. His most encouraging report is an evidence of what can be done by a competent person who has the interest of bird protection so much at heart. His report is here appended.

"In the matter of legislation something has been gained; one very important law has been enacted which is already showing good results, viz., 'That every Lord's day shall be close season; whoever hunts, kills or destroys game or birds of any kind on the Lord's day shall be liable to the penalties imposed for the violation of the law during other close seasons, and such penalties shall be in addition to those already imposed for the violation of the laws relating to shooting upon the Lord's day.' Still another law has been passed creating for five years a large reservation within the limits of the town of Essex, Mass., within which birds and animals are protected. In addition a most vicious marketmen's bill was defeated after a hard contest, as also another bill which sought to extend the open season on the Mergansers, or Sheldrakes. Five other protective bills, including my own, failed to secure favorable legislation, although a strong effort, accompanied by forcible and exhaustive arguments, was made in their behalf. There is no necessity, however, for the abandonment of the effort on this account, for it is visible to those who can read the handwriting on the wall that it is only a question of time when such protective bills will be successful, and while some of those who are at present engaged in the work may not see the realization, they are, nevertheless, preparing the ground and paving the way for those who may follow them. In all of the above bills I have taken an active part, being present and speaking for better protection.

"The Terns and Laughing Gulls domiciled during the breeding

season in Massachusetts have been well cared for, as usual, and although I understand an unusually large number of these birds has been killed during the past year for millinery purposes and decoration, I can safely state that *not one* has been taken for such purposes on any of the islands under my care. Owing to the continued disability of Mr. John Sandsbury, I was obliged at the last moment to find another person to fill the position of special police officer for the Muskeget group of islands. Mr. Edward E. Snow of Nantucket was selected, and was considerably appointed by the town of Nantucket to protect the birds during the past season. As might be expected, the result continues to show increasing numbers of Terns and Laughing Gulls in this locality, and each year an earlier date of arrival would seem to indicate their impatience to reach this secure breeding resort. When I look back to former years, and compare their situation then with what it is at present, I am sure we shall have no complaints from the birds' standpoint.

"On Penikese Island, in Buzzards Bay, Mass., the owners, Messrs. Homer Bros., have extended the same courtesy and aid to me as heretofore in furthering my plans, and it gives me much pleasure to acknowledge such indispensable help.

"Early in the year an effort was made by a society called the 'American Bird Restorers,' to reduce the numbers of House Sparrows (*Passer domesticus*) in Boston. I took no part in this movement. The effort met with widespread opposition and resistance, and the daily newspapers were teeming for weeks with literature on the subject. Little was accomplished, however, as far as a diminution of birds was concerned, and after the excitement waned the matter became quiescent. It brought out one fact, however, viz., that even the most despised birds have hosts of friends and protectors ready to champion their cause, regardless of merit."

In conclusion your Committee may say that with the establishment of the Audubon Societies and 'Bird-Lore' their work has been materially relieved, but they still stand as a central committee for the diffusion of information on any subjects upon which they may be consulted, and would especially urge upon the members of the Union the importance of their assistance in taking

advantage of every opportunity of securing the passage of good bird laws, and the enforcement of the same; and in the instruction of those who are in a position to encourage bird study among the children, and in directing young ornithologists into the true paths of ornithological research.

Respectfully submitted,

WITMER S. JONE,
Chairman.

SEVENTEENTH CONGRESS OF THE AMERICAN ORNITHOLOGISTS' UNION.

THE SEVENTEENTH CONGRESS of the American Ornithologists' Union convened in Philadelphia, Pa., Monday evening, November 13, 1899. The business meeting was held in the Council Room, and the public sessions, commencing Tuesday, November 14, and lasting three days, were held in the lecture hall of the Academy of Natural Sciences.

BUSINESS SESSION.—The meeting was called to order by Vice-President Merriam, in the absence of the President, Prof. Robert Ridgway. Sixteen active members were present. The Secretary's report gave the membership of the Union at the opening of the present Congress as 744, constituted as follows: Active, 48; Honorary, 17; Corresponding, 66; Associate, 613.

During the year the Union lost forty-six members—four by death, thirteen by resignation, and twenty-nine were dropped for non-payment of dues. The members lost by death were John Cordeaux,¹ a Corresponding member, who died at Lincoln, England, August 1, 1899, in the 69th year of his age; also Oliver Marcy,² LL. D., Dean of Northwestern University, who died at Evanston, Ill., March 19, 1899, aged 79; Major Joshua L. Fowler,³ U. S. A., who died on board the Steamer 'Ella,' July 11,

¹ For an obituary notice, see Auk, XVI, pp. 377, 378.

² For an obituary notice, see *Ibid.*, p. 211.

³ For an obituary notice, see *Ibid.*, p. 377.

1899, while returning home from Cuba, aged 53 years; and W. W. Colburn, of Springfield, Mass., aged 60 years, Associates.

The report of the Treasurer showed the finances of the Union to be in a satisfactory condition.

Robert Ridgway was reëlected President; Dr. C. Hart Merriam and Charles B. Cory, Vice-Presidents; John H. Sage, Secretary; William Dutcher, Treasurer. Charles F. Batchelder, Frank M. Chapman, Ruthven Deane, Witmer Stone, Drs. A. K. Fisher, Jonathan Dwight, Jr., and Thomas S. Roberts, were elected members of the Council. Messrs. W. R. Ogilvie Grant, and Arthur Humble Evans, of England, were elected to Corresponding Membership, and eighty-five new members were added to the list of Associates. As in previous years many of the new Associates were women. The usual reports of Standing Committees were received.

PUBLIC SESSION. *First Day.*—The meeting was called to order by Vice-President Merriam. A letter was read from Miss Juliette A. Owen, of St. Joseph, Mo., an Associate Member, donating \$100 to the Union, to be devoted to any ornithological purpose that might seem fitting to the Council. Miss Owen wrote that the amount sent was about the cost of the journey she expected to take in order to attend the Congress, but was prevented from going. The sum received will be the nucleus of a fund which it is hoped may be secured, the income to be used for the advancement of the science of ornithology.

Mr. Witmer Stone, Chairman of the 'Committee on Protection of North American Birds,' then read the report of his committee for the previous year. The report is published in this number of 'The Auk,' and will be issued as a pamphlet to be sold at a very low price for general distribution.

The reading of scientific papers began by the presentation by Mr. Frank M. Chapman of a paper 'On the plumages of certain Boreal Birds,' followed by 'The Summer Molting Plumages of Eider Ducks,' by Witmer Stone. Remarks followed by Mr. Cory, Drs. Merriam and Dwight, Messrs. Chapman, Rhoads, Palmer, Dutcher, and the author.

The opening paper of the afternoon session was by Dr. Jonathan Dwight, Jr., entitled 'The Sequence of Plumages and Molts in certain Families of North American Birds.'

The second title was 'Three years' migration data on City Hall Tower, Philadelphia,' by Mr. William L. Baily. Remarks followed by Messrs. Cory, Brewster, Saunders, Dutcher, Janney, Batchelder, Palmer, Daniel and Howe, Dr. Merriam and the author.

The third title was 'The Ranges of *Hylocichla fuscescens* and *Hylocichla f. salicicola*,' by Reginald Heber Howe, Jr. Remarks followed by Dr. Dwight.

The concluding paper of the afternoon was by Mr. Frank C. Kirkwood 'On the occurrence of the Egyptian Goose (*Chenalopex aegyptiaca*) in North America.'

Second Day.—The meeting was called to order by Vice-President Merriam.

'A Quantitative Study of Variation in the Smaller American Shrikes,' by R. M. Strong, was the first paper of the morning. Remarks followed by Dr. Dwight and the author.

The second title was 'An Oregon Fish Hawk Colony,' by Vernon Bailey.

Next came 'Further Remarks on the Relationships of the Grackles of the subgenus *Quiscalus*,' by Frank M. Chapman. Remarks followed by Mr. William Palmer.

The fourth title was 'A Peculiar Sparrow Hawk,' by William Palmer. Remarks followed by Mr. Fuertes.

The last paper of the afternoon was 'The Requirements of a Faunal List,' by W. E. Clyde Todd.

Mr. Louis Agassiz Fuertes then exhibited and explained a series of field sketches made by him in Alaska the past season from absolutely fresh birds. They showed the true life colors of the soft parts, mostly in the breeding season.

At the opening of the afternoon session Dr. Allen read, by request, a letter from Herbert Brown, of Yuma, Arizona, contradicting certain statements respecting the alleged existence of Egret farms in Arizona.

Mr. Witmer Stone then read 'Audubon's Letters to Baird, compiled from copies of the originals kindly furnished by Miss Lucy H. Baird.' These covered the period from the reply to the inquiry of the lad Baird, then of Carlisle, Pa., concerning the identity of a Flycatcher, until after the return of Audubon from

the Missouri River in 1843. The letters are of great historic interest and show the warm feeling of the older naturalist toward his young friend and companion.

The next title was the 'Bering Sea Arctic Snowflake (*Passerina hyperborea*) on its breeding grounds,' by Dr. C. Hart Merriam.

The remaining papers of the afternoon, all illustrated by lantern slides, were as follows:

'An Account of the nesting of Franklin's Gull (*Larus franklinii*) in Southern Minnesota,' by Dr. Thos. S. Roberts.

'Bird Studies with a Camera,' by Frank M. Chapman.

'Home Life of Some Birds,' by William Dutcher.

'The Effects of wear upon Feathers,' by Dr. Jonathan Dwight, Jr.

'Slides—Series of Kingfishers, Gulls, etc.,' by William L. Baily.

Third Day.—The meeting was called to order by Vice-President Merriam. Before proceeding to the reading of papers, resolutions were adopted, thanking the Academy of Natural Sciences for the use of a hall for a place of meeting for the Union, and for other courtesies extended; to the Philadelphia members of the Union for their cordial welcome and many hospitalities shown visiting members; to the Zoölogical Society of Philadelphia for its kind invitation to visit the Gardens of the Society; to Dr. W. P. Wilson, Director, for his polite invitation to the members of the Union to visit the Export Exposition; to Governor Pingree, of Michigan, and Mayor Maybury, of Detroit, for their cordial invitation to the Union to hold its next Congress in Detroit; to Miss Juliette A. Owen, of St. Joseph, Mo., for the gift of one hundred dollars to the Union, to be expended as deemed best by the Council, and to Mr. W. H. Wetherell, the owner of the property, for his polite invitation to the members of the Union to visit Mill Grove, the former home of John James Audubon.

As the first paper of the morning Dr. A. K. Fisher made 'Remarks on some of the more interesting birds of the Harriman Alaska Expedition.' The notes of many of the birds referred to were imitated by Mr. Fuertes, also a member of the Harriman party.

The second title, 'On the Orientation of Birds,' by Capt. Gabriel Reynaud, of the French Army was read in part, in the absence of the author, by Mr. Chapman. Remarks followed by Dr. Allen and Messrs. Chapman, Dutcher, Morris, Palmer, and Stone.

Next came 'The Molt of the Flight-feathers in Various Orders of Birds,' by Witmer Stone. Remarks followed by Mr. Chapman.

The fourth title was 'Notes on the Flammulated Screech Owls,' by Harry C. Oberholser. Remarks followed by Mr. Hindshaw and the author.

The fifth title was 'Language of the Birds,' by Nelson R. Wood.

The opening paper of the afternoon session (Vice-President Cory in the Chair) was by Mr. Harry C. Oberholser, entitled 'A New Wren from Alaska.'

The next title was 'Some Cuban Birds,' by John W. Daniel, Jr. Remarks followed by the Chair and the author.

Mr. Louis Agassiz Fuertes then gave, by special request, imitations of the notes of wild birds. Remarks followed by Messrs. Hindshaw, Stone, and Fuertes.

The seventh and concluding paper, 'On the Perfected Plumage of *Somateria spectabilis*,' by Arthur H. Norton, was read in part by Mr. Witmer Stone, in the absence of the author.

Mr. Stone, then exhibited and called attention to numerous specimens of Arctic birds in young plumages collected by Edward A. McIlhenny.

An honored visitor to the daily sessions was Dr. Samuel W. Woodhouse, of Philadelphia, who made explorations in New Mexico and Arizona in the early fifties. Woodhouse's Jay (*Aphelocoma woodhouseii*) was named after him more than forty years ago by Prof. Baird.

On Friday, November 17, after adjournment of the Union, at the invitation of Mr. W. H. Wetherell, owner of the property, Mr. George Spencer Morris conducted a party to Mill Grove, on the Perkiomen, the former home of Audubon. Mrs. Morris F. Tyler, of New Haven, Conn., wife of the treasurer of Yale University, a granddaughter of Audubon, was a member of the party.

The next meeting of the Union will be held in Cambridge, Mass., commencing November 12, 1900.

The attendance of members at the recent Congress was much larger than at any previous one. They came from distant parts of the United States and from Canada.

JNO. H. SAGE,
Secretary.

GENERAL NOTES.

A Rare Record for Eastern Long Island.—On October 7, 1899, I received a fine specimen of the Fork-tailed or Sabine's Gull (*Xema sabinii*). It was shot the day before in Gardiners Bay, between Orient, L. I., and Shelter Island, and sent me in the flesh. It was the only one seen. It was in young-of-the-year plumage, and on dissection proved to be a female. It was in excellent condition, with a thick layer of fat all over the body. The stomach contained an entire cut-worm moth (*Agrotis*), and the macerated remains of other insects, picked up, without doubt, from the water where they had fallen exhausted, having wandered from the land. The above, so far as I am aware, is a new record for Long Island, and the farthest south for the species under consideration.—W. W. WORTHINGTON, *Shelter Island Heights, N. Y.*

Some Notes on the Herring Gull (*Larus argentatus*).—The evidence that there is no such bird as *Larus argentatus smithsonianus* continues to accumulate. Doubts of the validity of this subspecies have been expressed before, both orally and in print. (Cf. Knight, List of Birds of Me., p. 19; Maine Sportsman, July, '98, p. 13; Journal of the Me. Orn. Soc., Oct. 1899, p. 37). These records refer to the occurrence in Maine of specimens referable to *L. argentatus*, and finally question the existence of any subspecific differences between American and European specimens. While in Portland a short time ago I had occasion to visit the shop of a local taxidermist and noticed a large number of these birds which he had skinned for sale to milliners. After carefully examining fully 100 specimens, which had been shot in Portland Harbor and vicinity, I was delighted to find ten specimens which were, as regards the first primaries, typical examples of *L. argentatus*. Three of the birds had the first primary entirely white at the tip without any trace of a black bar or dot, and the others had the black bar only slightly indicated. Other specimens had the black bar more complete, and a perfect series of gradations could be found between adult birds with

only white on the apical part of the first primary and birds having a black bar half an inch wide near its extremity. The non-existence of the so-called subspecies *L. a. smithsonianus* seems to be completely demonstrated. At the same time I had the opportunity of examining a large number of Kittiwake Gulls and found a greater variation in their primaries than in those of the Herring Gull. In both cases specimens examined for comparative purposes were adult birds. — ORA W. KNIGHT, *Bangor, Me.*

The Occurrence of the Egyptian Goose in North America.—It gives me great pleasure to bring to the attention of the American Ornithologists' Union a specimen of the Egyptian Goose (*Chenalopex aegyptiacus*) shot on Dec. 5, 1898, at Havre de Grace, Md. I received the bird in the flesh on the 10th, through the kindness of Walter T. Jackson of that place, who sent the following note with it:—"Shot by John Simpers along shore 100 yards from Point Concord Light, Havre de Grace, Md. Two other birds of same species were seen the following day."

A few days later I visited Havre de Grace; John Simper was off on the 'flats,' but everyone in that duck shooting town knew of the strange bird, so I had no difficulty in hearing of it. I visited the scene of the shooting, which was a small indentation in the shore, with considerable growth in it, and a marshy piece of ground at its head; here the bird was seen early in the morning, and John Simper went for his gun, came back and shot it. With regard to the two reported as seen next day, I heard several contradictory stories, and question the identity of the birds seen.

The bird shot was in perfect plumage, and showed no signs of having ever been in confinement; the body, however, was emaciated to the last degree, and the stomach contained only two or three small gravel stones; the bird was evidently in the last stages of starvation, which would account for the remarkable tameness freely commented on at Havre de Grace.

As far as I know the only other record for this species in North America, is of one taken at Canarsie, L. I., on Jan. 3, 1877, and recorded by John Akhurst of Brooklyn, N. Y., in the Bull. Nutt. Orn. Club, Vol. II, April, 1877, p. 52. Mr. Geo. N. Lawrence, in a letter to Mr. Akhurst, stated in regard to this specimen: "Its acquisition is worthy of being noted, and whether a straggler or an escaped specimen may be ascertained in the future." Apparently this statement governed Baird, Brewer, and Ridgway in their note on the species (Water birds, p. 434), where they say "a common species in aviaries; so that it is altogether probable that the example in question [the Canarsie bird] was one escaped from confinement." Bechm's 'Thierleben' (Birds, Vol. III, 1882, p. 471), in commenting on the occurrence of this species in various European countries, says practically the same thing, but the species is generally included as a valid one in the countries where it has been taken in a state of nature.

As the species is a great wanderer I can see no reason why one or more should not occasionally cross the Atlantic. The condition in which this specimen was received certainly proved it to have been a long time without food, and being a fresh water feeder, the only way it could have reached Maryland without finding a suitable feeding place would have to be across the Atlantic. If stronger evidence cannot be brought forward against it, I see no reason why this beautiful species should not be added to the North American Fauna. — F. C. KIRKWOOD, *Baltimore, Md.*

The Occurrence of Steller's Eider (*Eniconetta stelleri*) in the Gulf of St. Lawrence. — We are indebted to Mr. Napoleon A. Comeau, who has done so much to increase our knowledge of the distribution of birds in the Point des Monts region of Quebec, for two records of the occurrence of Steller's Eider in the Gulf of St. Lawrence. The first specimen which he secured was a female taken on February 17, 1898, at Godbout, where it was associated with a flock of Oldsquaws. The second example was a fine male, which was killed by Joseph Morin, a seal hunter, about a month later near Point des Monts. It was found among a flock of Goldeneyes. Previous to the capture of these two specimens Mr. Comeau had seen occasional individuals among flocks of well known species, which he did not recognize and had wondered if they might not be Labrador Ducks. After examining the male Steller's Eider, however, he appreciated that the birds formally observed undoubtedly belonged to the latter species.

These records are especially interesting as coming from the eastern side of the continent where the bird appears to be of accidental occurrence, and where, as far as known, it has been observed only at Disco Bay, Greenland, and Cumberland Sound. — A. K. FISHER, *Washington, D. C.*

Pipile vs. Pipilo. — If mere difference in inflexional termination of words otherwise identical in form be held insufficient for their discrimination, then *Pipile* Bp., Comptes Rendus, XLII, 1856, p. 877, is voided by *Pipilo* Vieill., Anal., 1816, p. 32, and the three current species of the former genus may be called *Cumana* (gen. nov.) *cumanensis* (Jacq., 1784), or *C. pipile* (Jacq., 1784), *C. jacutinga* (Spix, 1825), and *C. cufubi* (v. Pelz., 1858). But it may be a question whether *Pipile* and *Pipilo* are not radically distinct words. Vieillot's name is good Latin, being first person, singular, present indicative of a verb meaning 'to chirp'; while Bonaparte's may be a barbarous word of South American origin. If the latter shall so prove, how shall we dispose of the case? — ELLIOTT COUES, *Washington, D. C.*

Strix vs. Aluco. — This is a case on which the last word does not appear to have been said, and I, for one, should be glad to have it settled. It involves not only two generic, but also two family names. If I am at

fault in my present contention, I hope to be promptly set right by some one who may be able to see further into the intricate matter than I can. I will put the case in the following shape:

1. The genus *Strix* Linn., S. N., I, 10th ed., 1758, p. 92, included, of course, all Owls known to him. *S. aluco* Linn., *ibid.*, p. 93, sp. No. 6, is the Barn Owl, as shown by the references. But how does this fact make *S. aluco* of 1758 the "type" of *Strix*? There are no "types" of Linnæan genera which included more than one species, except by some subsequent process of restriction by elimination at the hands of some other author.

2. The species *Strix aluco* of Linn., S. N., I, 12th ed., 1766, p. 132, No. 7, is the Wood Owl, a bird of a different modern family from *S. aluco* of 1758.

3. Meanwhile, between the dates 1758 and 1766, the Linnæan genus *Strix* was first subdivided, by Brisson, in 1760; and Brisson made *S. stridula* the type of his restricted genus *Strix*. This act placed the Wood Owls in the genus *Strix* Briss., 1760, and threw the Barn Owls out of the genus *Strix* Linn., 1758. As a further consequence, the family to which the Wood Owl belongs is Strigidæ.

4. The first tenable generic name for the Barn Owls appears to be *Aluco*, Fleming, Philos. Zool., II, 1822, p. 236; and if so, the family to which the Barn Owls belongs is Aluconidæ.

5. It seems to me, therefore, that our two families of Owls should stand as they have stood in my 'Key' since 1884, and not as they do in the A. O. U. List.

I may add that Professor Newton, Ibis, 1876, pp. 94-104, reached the same conclusion, which he also maintained in Dict. B., 1894, p. 673. This is the more remarkable, inasmuch as he employed a somewhat different course of reasoning, not taking Linnæus back of 1766, and thus differing from the A. O. U. Code. But I think my own argument is strictly according to the Code.—ELLIOTT COUES, *Washington, D. C.*

The 'Churca' (*Geococcyx californianus*).—The 'Land of Sunshine,' XI, No. 6, Nov., 1899, contains a translation (from Docs. para la Hist. Mexico, 4th ser.) of certain Memorias para la historia natural de California, written by an anonymous Franciscan priest in the year 1790. Among the birds noted is the following:

"The *Churca* is a kind of pheasant which has a long bill, dark plumage, a handsome tail and *four feet*. It has these latter facing outward in such fashion that when it runs it leaves the track of two feet going forward and two going backward."

If we read "toes" for "feet," this quaint description is unmistakably that of the Roadrunner or Chaparral Cock, as the editor of the Magazine, Mr. Charles L. Lummis, remarks in a footnote; and the notice antedates by many years the scientific description of *Saurothera californiana* by Lesson in 1829.—ELLIOTT COUES, *Washington, D. C.*

The Red-headed Woodpecker near Chicago, Ill.—I do not think that the Red-headed Woodpecker (*Melanerpes erythrocephalus*) is as rare a winter resident in the vicinity of Chicago as Mr. Bryan seems to suppose (see Auk, XVI, July, 1899, p. 272). Years ago, when living in Racine, Wis., I remember seeing individuals of the species during several winters. They remained through the season. This was near the town, on the Lake shore, sixty miles north of Chicago. They were never at all numerous, nor was every successive year marked by their appearance. One, or perhaps two, might be seen on the coldest days. The severity of the weather made no difference. The birds were quite as likely to remain through the hardest winters as through mild and open ones. 'Birds of Michigan,' by A. J. Cook, speaks of the Red-headed Woodpecker as occasional in winter. The Geology of Wisconsin, Section Ornithology, if I remember rightly, says about the same thing.

I hope this handsome Woodpecker, the most showy of North American birds, is not diminishing in numbers. It used to be fairly abundant in New England, for instance, but now it is a rare visitant excepting, perhaps, in the remotest parts.—G. S. MEAD, *San Francisco, Cal.*

Tree Swallows by the Million.—Early in September I visited the Long Beach Club at Barnegat, N. J. This club is located on that long, narrow point of land which lies between the ocean and Barnegat Bay. It is about ten miles in length and the club is located two miles from the extreme point. The width of the land here between the bay and ocean is only a few hundred feet. While there I was attracted by an extraordinary flight of Tree Swallows (*Tachycineta bicolor*) which commenced about eight o'clock each morning and lasted several hours, the birds flying always up the beach toward the inlet and never in the opposite direction. Evidently they crossed the channel and returned later in the day along the opposite shore of the bay to their night quarters. My interest in this daily flight was greatly aroused by the enormous numbers of the birds. My stay lasted but a few days, but on the 19th I again visited the club and on the morning of the 20th watched for the birds, hoping to see them again. Not a Swallow was seen until the solid column of the flight appeared, and it was at once apparent that where there were hundreds two weeks previous there were now thousands. The flight was compact like a swarm of bees and at times almost darkened the sky. Most of the time there were two distinct columns, one flying low just over the water, and the other high up in the air. I watched the flight for hours, and the air in both directions seemed alive with them as far as the eye could reach. In attempting to shoot one for identification and mounting, a single discharge of my gun killed ten birds, so compact was the flight. Two of these (evidently adult males) were in magnificent plumage, their backs fairly glistening with the most brilliant steel-blue color. Three or four others showed some color, and the rest (probably young birds) none at all. The next day I again watched the flight in company with my companion

the Hon. Clarence Lexow, of New York. A northeast gale was blowing against which the birds were flying with much difficulty. A heavy rain soon set in and the wind blew furiously, still the flight continued and it was rarely that the chain was broken, even for a few seconds. The appearance of a Sparrow Hawk among them had the effect of causing the birds to rise to a great height, but the flight was in no respect retarded. After watching the birds nearly all of the forenoon we made a careful estimate of the number that had passed and we calculated that it was not to be reckoned by tens of thousands or hundreds of thousands, but by millions.—JOHN LEWIS CHILDS, *Floral Park, N. Y.*

Intelligence of the Shrike.—When studying birds in Florida last year, I took a shot at a fine specimen of the Southern Shrike (*Lanius ludovicianus*) for the purpose of adding him to my collection. The bird flew a considerable distance, wounded, and attempted to light in the branches of a tree; but was unable to do so and fell to the ground. As I approached to pick him up, he arose from the ground, issued a cry of distress and fluttered away with great difficulty. Immediately another Butcher-bird darted out from some near-by tree, flew to its wounded companion, circled about him and underneath him, buoying him up as he was about to sink to the ground. These tactics were repeated continually, the birds rising higher and flying further away until they had gone nearly out of sight and safely lodged in the top of a tall pine. I did not pursue the bird further, feeling that such devotion and intelligent assistance on the part of the second bird was worthy of success. In all my observations of birds I never before, or since, witnessed such an interesting exhibition.—JOHN LEWIS CHILDS, *Floral Park, N. Y.*

The Bohemian Waxwing in Onondaga County, N. Y.—During the hard snow storm of Feb. 10, 1899, a flock of about 50 Cedar Waxwings were seen in a mountain ash tree, feeding on the berries. The tree is on one of the principal residence streets of Syracuse, and is thickly populated. The observer, being an amateur collector, and living but a few houses from the place, returned for his gun and shot into the flock, securing several Cedar Waxwings, and one, which was seen to drop some distance from the tree, proved to be a Bohemian Waxwing (*Ampelis garrulus*). This is the first specimen recorded from Onondaga County. It seems strange that this bird should be associated with its brother species.

I would like to know if it has been taken or recorded farther south than Syracuse, and whether these two species are in the habit of flocking together?—A. W. PERRIOR, *Syracuse, N. Y.*

Date of Discovery and Type Locality of the Mountain Mockingbird.—The formal description* of *Orpheus montanus* in Townsend's Narr., 1839, App. p. 338, states that the bird "inhabits the banks of the Platte River, west of the Rocky Mountains." This is impossible, as there is no Platte

River west of the main divide of the Rocky Mountains. But another passage in the 'Narrative,' p. 70, gives the desired data to fix the date of discovery and precise locality. Writing of June 15, 1834, Townsend says: "I found here a beautiful new species of Mockingbird, which I shot and prepared"; and gives a footnote referring to the Appendix as above cited for the description. At the date in mention, N. J. Wyett's expedition, accompanied by Townsend and Nuttall, had made the South Pass over the Continental Divide on the 14th, and were about to camp on Big Sandy River, a tributary of Green River, in Wyoming. They were on the already established fur traders' route which went about S. W. from the Pass to the Big Sandy at or near the confluence of the latter with Green River. — ELLIOTT COUES, *Washington, D. C.*

Notes on Birds of Long Island.—*Ardea egretta* and *A. candidissima*.—It is a pleasure to note that both 'White Herons' are still entitled to notice among the present avifauna of Long Island, notwithstanding the continued persecution to which both species throughout the entire limits of their range have been of late years subjected, and the consequent diminution in their numbers.

Their persistent occurrence on Long Island in spite of their decline in numbers is rather remarkable and may be regarded as denoting that Long Island is an attractive feeding ground for this genus of birds. It may also be that there exists an instinct affecting certain individuals leading them to migrate in the autumn in a direction contrary to that of the species as a whole, or, that the genus is simply prone to a wandering, restless disposition. Since Mr. Dutcher's note on the former was published (*Auk*, III, 1, p. 435) nothing, I think, has appeared to show that either of the birds now nest on Long Island, and it seems questionable whether the birds have nested so far north since the prevailing demand for their plumes first began. Late occurrences of the two species are as follows:

During the autumn of 1897 several 'White Herons' were noted about the shores of Jamaica Bay, Queen's County, by several observers, from whom I heard of them. Chas. Ward, a gunner of Rockaway Beach, shot several on or about October 1, one of which was merely wing-tipped. This bird was preserved alive for some time, in which condition I saw it on October 9, it having then been in captivity about a week or ten days. The bird was confined in a boat builder's shop where its unnatural surroundings affected it unfavorably, as it appeared drooping and sick. It proved to be a specimen of the American Egret, *Ardea egretta*.

A flock of Snowy Herons, *Ardea candidissima*, comprising six or seven individuals, was seen on the salt meadows near East Rockaway in mid-August this year (1899). Two of these, which were wing-tipped, are now in the possession of Mr. Daniel DeMott of East Rockaway. They are at present in apparently excellent condition, established in roomy, comfortable quarters, with out-door run and with in-door shelter. Mr. DeMott

recalls having seen 'White Herons' in his locality fifteen years ago, but none since until the present summer. He writes: "The two which I now have would eat from my hand a week or two after their capture. I now have them in a yard enclosed in wire netting with a coop eight feet high attached. I notice they sit in the uppermost part of the coop most of the time during the day unless called out to be fed; but when night comes they will leave the coop and sit in the open yard until morning." The chief food of the Herons is small fish, with which they are kept abundantly supplied. Mr. DeMott has several other wild birds quartered in separate enclosures, including Black-bellied Plovers, Turnstones, and one Golden Plover, all in apparently excellent condition and comprising in all a decidedly interesting natural history exhibit.

Cathartes aura.—The geographical distribution of the Turkey Vulture is one of the most interesting facts connected with its history. Occurring regularly but a short distance south of our limits, and often seen even in the winter but fifty miles south of us (Trenton, N. J.), and being a bird of such well-known powers of flight, it yet so rarely occurs north of its regular haunts that it is as if a well recognized line demarked its limits, beyond which its occurrence is extremely singular. A bird of this species was shot at Rockaway Beach by Mr. R. L. Peavey of Brooklyn, on July 15, 1899, in whose fine collection of mounted birds it now is. Length of specimen, 29 inches; wing, 21 inches.

Accipiter atricapillus.—An immature specimen of the American Goshawk, also in the collection of Mr. R. L. Peavey, was shot by him at Rockaway Beach, Dec. 18, 1898.

Strix pratincola.—The Barn Owl is rare enough on Long Island to justify mention of each instance of its occurrence. The specimen here referred to was taken at Gardiners Island, and thus constitutes one of the more northern records for the species. Mr. E. B. Muchmore of Easthampton is the possessor of the mounted skin of this specimen. Here it was seen by the writer last summer (1899), and in reply to his inquiries concerning it, Mr. Muchmore writes: "It was picked up on Gardiners Island during the very severe weather of last March. It was very thin and had one foot broken. I should not have tried to save the specimen if it had not been a stranger to me." In a subsequent communication in reply to an inquiry regarding the remote possibility of its having drifted ashore and hence involving a suggestion of other than natural causes for its presence here, Mr. Muchmore says that it was found away from the beach and that there were no indications of its having been washed ashore. He writes: "The Barn Owl spoken of was found away from where the water could possibly have washed it ashore; and, furthermore, its condition indicated that it had not been floating in the water."

Syrnium nebulosum.—The Barred Owl is rather rare on Long Island. The present record has to do with its occurrence as a bird of the city, my attention having been attracted to it by a crowd which gathered to observe the unfamiliar sight of a large bird in the heart of the city,

sitting with every appearance of contentment in the bare branches of a tree. The small boys, however, soon began to pelt it with stones, though it was with difficulty that the bird could be made to fly, and even the presence of a policeman had little effect in restraining them.

In spite of much persecution the bird remained in the vicinity for several days more, but the commotion and excitement produced by his presence led to his premature end. Various missiles aimed at the Owl by the crowd during the day became a menace to the windows and heads and led the householders to consider the bird a rather unwelcome visitor. The bird was accordingly shot and afterward fell into my possession. The contents of the stomach, as well as beak and claws, bore testimony to the havoc which he had made the preceding night among the English Sparrows. — WILLIAM C. BRAISLIN, M. D., *Brooklyn, N. Y.*

Newfoundland Notes. — The following list of birds was observed on a trip up the Humber River in Newfoundland, which lasted from August 10 to September 24, 1899. The list is not intended as in any way a complete one of the birds to be seen at that time on the island, but merely of those which I happened to observe in the course of a fishing and hunting trip, and as such it is offered for what it may be worth.

1. *Gavia imber*. LOON. — Abundant.
2. *Larus argentatus smithsonianus*. AMERICAN HERRING GULL. — Abundant.
3. *Larus marinus*. GREAT BLACK-BACKED GULL. — Breeds sparingly at Adies Pond; doubtful if I saw any.
4. *Sterna hirundo* (or *paradisæa*). — A Tern, either Common or Arctic, was seen in considerable numbers near the mouth of the river.
5. *Merganser serrator*. RED-BREASTED MERGANSER. — Breeds abundantly.
6. *Anas obscura*. BLACK DUCK. — Breeds abundantly.
7. *Anas carolinensis*. GREEN-WINGED TEAL. — Rather uncommon. Several observed.
8. *Aythya affinis*. LESSER SCAUP DUCK. — Sept. 17, one killed at Adies Pond.
9. *Glaucionetta clangula americana*. AMERICAN GOLDEN-EYE. — Breeds abundantly.
10. *Erismatura rubida*. RUDDY DUCK. — One seen Sept. 1, at Adies Pond.
11. *Branta canadensis*. CANADA GOOSE. — Breeds commonly.
12. *Botaurus lentiginosus*. AMERICAN BITTERN. — Abundant.
13. *Gallinago delicata*. WILSON'S SNIFE. — One seen August 20.
14. *Totanus flavipes*. YELLOW-LEGS. — Abundant in late August and early September.
15. *Actitis macularia*. SPOTTED SANDPIPER. — Abundant.
16. *Circus hudsonius*. MARSH HAWK. — Rather uncommon.
17. *Accipiter velox*. SHARP-SHINNED HAWK. — Common.

18. *Buteo borealis*. RED-TAILED HAWK. — Rather uncommon.
19. *Archibuteo lagopus sancti-johannis*. AMERICAN ROUGH-LEGGED HAWK. — A guide reported seeing a large black Hawk on September 10.
20. *Haliaeetus leucocephalus*. BALD EAGLE. — Common.
21. *Falco peregrinus anatum*. DUCK HAWK. — A guide described a Hawk seen August 15, which must have been this species. Said to nest on the cliffs along the river.
22. *Falco columbarius*. PIGEON HAWK. — Small Hawks were seen commonly. Some were undoubtedly of this species. Others may have been *Falco sparverius*.
23. *Pandion haliaëtus carolinensis*. FISH HAWK. — Common.
24. *Bubo virginianus*. GREAT HORNED OWL. — Common.
25. *Scotiaptex cinerea*. GREAT GRAY OWL. — One seen August 23.
26. *Ceryle alcyon*. BELTED KINGFISHER. — Abundant.
27. *Dryobates villosus leucomelas*. NORTHERN HAIRY WOODPECKER. — Fairly common.
28. *Dryobates pubescens*. DOWNY WOODPECKER. — Fairly common.
29. *Picoides arcticus*. ARCTIC THREE-TOED WOODPECKER. — Common.
30. *Colaptes auratus*. FLICKER. — One seen September 9.
31. *Empidonax flaviventris*. YELLOW-BELLIED FLYCATCHER. — Two seen August 15.
32. *Perisoreus canadensis*. CANADA JAY. — Abundant and very tame.
33. *Corvus corax principalis*. NORTHERN RAVEN. — Common. Apparently it takes the place of *Corvus americanus*, which is said not to occur on Newfoundland.
34. *Scolecophagus carolinus*. RUSTY BLACKBIRD. — Fairly common.
35. *Spinus tristis*. AMERICAN GOLDFINCH. — Their characteristic note heard on several occasions, but none seen.
36. *Spinus pinus*. PINE SISKIN. — Large flocks seen commonly.
37. *Zonotrichia albicollis*. WHITE-THROATED SPARROW. — Fairly common.
38. *Junco hyemalis*. SLATE-COLORED JUNCO. — Several seen September 23.
39. *Melospiza georgiana*. SWAMP SPARROW. — Not uncommon.
40. *Passerella iliaca*. FOX SPARROW. — Two seen August 17, evidently young birds just able to fly.
41. *Vireo noveboracensis*. WHITE-EYED VIREO. — A single bird was observed for some minutes in full song, and within five or six feet, on September 8.
42. *Dendroica striata*. BLACK-POLL WARBLER. — Seen in large numbers on August 27.
43. *Dendroica palmarum hypochrysea*. YELLOW PALM WARBLER. — Seen abundantly in flocks from September 8 on.
44. *Seiurus noveboracensis*. WATER THRUSH. — Abundant.
45. *Sylvania pusilla*. WILSON'S WARBLER. — Abundant.
46. *Sitta carolinensis*. WHITE-BREASTED NUTHATCH. — Common.

47. *Sitta canadensis*. RED-BREASTED NUTHATCH. — One seen August 18.
48. *Parus atricapillus*. CHICKADEE. — Most abundant.
49. *Turdus fuscescens*. WILSON'S THRUSH. — One seen September 14.
50. *Merula migratoria*. AMERICAN ROBIN. — One seen August 31. Said to be common.

The Great Blue Heron (*Ardea herodias*) was seen abundantly in Cape Breton, but apparently does not cross the Straits into Newfoundland. — LOUIS H. PORTER, *New York City*.

RECENT LITERATURE.

Merriam's Biological Survey of Mount Shasta.¹ — "All high mountains," as Dr. Merriam remarks in his 'Introduction,' "particularly those that stand alone, are likely to throw light on the problems of geographic distribution, and are worthy of careful study. Shasta, not only because of its great altitude [14,500 feet], but even more because of its intermediate position between the Sierra and the Cascades, promised an instructive lesson, and was, therefore, chosen as a base station for part of the field work of 1898."

An introduction of eight pages contains an itinerary of the field work, the personnel of the party, a notice of previous publications on Mount Shasta, and a list of the new species described in the report — 5 plants and 8 mammals. The subtitles indicate the general character of the report, as follows: 'General Features of Shasta' (pp. 17-30); 'The Forests of Shasta' (pp. 30-46); 'Forest Fires' (pp. 46, 47); 'Slope Exposure' (pp. 47-52); 'Life Zones of Shasta' (pp. 52-68); 'The Boreal Fauna and Flora of Shasta contrasted with corresponding Faunas and Floras of the Sierra and the Cascades' (pp. 69-82); 'Efficiency of Klamath Gap as a barrier to boreal species compared with that of Pitt River and Feather River Gaps collectively' (pp. 83, 84); 'Sources of the Boreal Faunas of

¹ Results of a Biological Survey of Mount Shasta, California. By C. Hart Merriam, Chief of Division of Biological Survey. = North American Fauna, No. 16, 8vo., pp. 1-179, pls. i-v, and 46 text illustrations. U. S. Department of Agriculture, Division of Biological Survey. Washington: Government Printing Office. Published Oct. 18, 1899.

Shasta and of the Sierra and the Cascades' (pp. 85, 86); 'Mammals of Shasta' (pp. 87-107); 'Birds of Shasta and Vicinity' (109-134); 'Notes on the Distribution of Shasta Plants' (pp. 135-169); 'Index' (pp. 171-179).

In the work of exploration, Dr. Merriam was aided by Vernon Bailey, chief field naturalist of the Biological Survey, Wilfred H. Osgood, Walter K. Fisher, and Richard T. Fisher, assistants. In addition to the work on and near Shasta, three cross sections were made of the Sierra Nevada north of latitude 39°, a line was run from Black Rock Desert, Nevada, to Shasta, and from Shasta across the wild and little known mountains between Shasta and the ocean, to Humboldt Bay.

The topographical features of Shasta are illustrated by numerous half-tone cuts and plates, from photographs, and the floral and faunal features, as influenced by altitude, air currents, and slope exposures, are duly set forth and discussed. The life zones of Shasta are the Upper Sonoran, Transition, Canadian, Hudsonian, and Arctic-Alpine. "Shasta stands on a Transition zone plane, with a dilute tongue of Upper Sonoran approaching its northern base by way of Klamath and Shasta valleys. . . . The Upper Sonoran element in the region is dilute and is limited to Shasta Valley at the north base of the mountain, which it reaches by way of the Klamath country on the north and northeast. It has no connection whatever with the Upper Sonoran of the Sacramento Valley on the south." The Transition extends up to an average altitude of about 5,500 feet; the Canadian to about 7,500 feet; the Hudsonian to about timber line, or to 9,500 feet; the Alpine to about 11,000 feet, above which is the bare ice-clad summit, rising to 14,500 feet. The species of mammals, birds, and plants of the several zones are tabulated in accordance with their ranges and restrictions. The transition between zones is, of course, gradual, there being an overlapping belt between each of about 800 feet.

The list of birds of Shasta and vicinity numbers 136 species, and is based almost wholly on the observations of various members of the party made during the season of 1898, the chief data from other sources being derived from Mr. C. H. Townsend's 'Field Notes on the Mammals, Birds and Reptiles of Northern California,' published in 1887. In addition to the regular assistants already mentioned, observations on the birds are credited to Miss Florence A. Merriam and Mr. John H. Sage, who were also members of the general field party.

Dr. Merriam's report, it is needless to say, is not only a valuable contribution to our knowledge of the physical geography and the fauna and flora of Shasta, but also throws much light upon the causes, both local and general, that determine the distributional limits of species.—J. A. A.

Palmer's 'The Avifauna of Pribilof Islands.'—Among the many important contributions to the natural history of the Pribilof Islands contained in Part III of the recently issued report of the United States

Fur Seal Commission (1896-97)¹ is a report on the birds by Mr. William Palmer,² prepared from his own "experience and collections on the islands from May 27 to August 11, 1890, and partly from the published results of the visits of Mr. Henry W. Elliott, in 1872-73 and 1876," and also on "the literature, the collections in the United States National Museum, and from the naturalists who have visited the group in recent years. Of the 69 species here listed, 20 are apparently for the first time recorded from the islands, and a large amount of new and interesting information on the habits, changes of plumage, etc., is here for the first time published. The list, however, is necessarily "incomplete, as the winter-occurring birds have been little noted." Mr. Palmer gives an account of the topography of the islands, in relation to its influence on the distribution of the birds, with a sketch of its ornithological history, including a formal bibliography of the subject. The geographical distribution of the Pribilof birds is analyzed at length (pp. 363-369), and there are several pages (pp. 369-372) on their migration, in which Mr. Palmer gives a somewhat free rein to his imagination in supposing that the ancestors of the present bird population of the Pribilofs had, "in the remote geological past," "a more happy course over contiguous land areas which have since been submerged," to help them in their migratory journeys between the Aleutian and Hawaiian groups of islands.

The list proper occupies pp. 373-427, and contains, besides full bibliographical references to the literature of the subject, usually extended notes on their habits, abundance, and distribution in the islands, and much valuable information upon the growth, character, and changes of plumage in many of the species. This, in the case of the Cormorant, affords basis for generalizations and hypotheses regarding the evolution of the Cormorant group. The genus *Arenaria* receives extended notice, with the result that two species are recognized from North America, namely (1) *A. interpres*, the form of the Old World, found also in "western Alaska from the Aleutians to Point Barrow"; also in Greenland. "Breeds from Japan and Alaska westward around the more northern British Islands, Azores (?) [!], and Greenland." (2) *A. morinella*, in

¹ The Fur Seals and Fur Seal Islands of the North Pacific Ocean. By David Starr Jordan, President of Leland Stanford Jr. University, Commissioner in charge of Fur-Seal Investigations of 1896-97. With the following Official Associates: Leonhard Stejneger and Frederic A. Lucas, of the U. S. National Museum; Jefferson F. Moser, Lieutenant-Commander, U. S. N., in command of the U. S. Commission Steamer 'Albatross'; Charles H. Townsend, of the U. S. Fish Commission; George A. Clark, Secretary and Stenographer; Joseph Murray, Special Agent. With special papers by other contributors. Washington: Government Printing Office. 1898 [= 1899]. 4 vols., 4to., with numerous maps, plates, and text illustrations.

² *Op. cit.*, Part III, 1899, pp. 355-431, pll. xxxviii-xli.

"America from the Arctic regions north of Hudson Bay and westward to the Mackenzie River, along the Atlantic watershed, though generally coastwise, to Patagonia and the Falkland Islands. Rare on the Pacific slope. Breeds about Hudson Bay, northward and eastward." *A. morinella* (Linn.) is distinguished as smaller than *A. interpres* (Linn.) with chestnut instead of black predominating above, with more clove brown, and with orange instead of vermilion feet. Detailed descriptions of the various plumages of each form are given, with a table of comparative measurements. The name *morinella* is based on Catesby's pl. lxxii, "The Turnstone or Sea-Dottrel."

Another innovation in nomenclature is the use of the name *Hirundo erythrogastra unalaschkensis*, (Gmelin) for the Alaskan Barn Swallow (p. 422). Although seen on St. George Island, no specimens appear to have taken there.

Plate xxxviii gives several views on Walrus Island, showing the breeding places of sea birds; pl. xxxix represents nine eggs of the Pacific Murre, selected to show variation in size, shape, and markings; pls. xl and xli illustrate the "development of feathers." The paper forms a valuable contribution to North American ornithology.—J. A. A.

Howe and Sturtevant's 'Birds of Rhode Island.'¹—This is the first attempt at an exhaustive enumeration of the birds of the State of Rhode Island, and has been commendably well done. It consists of a 'Review of former publications on Rhode Island Birds, and of State Collections' (pp. 7-9); 'Migration, with List of Breeding Birds' (pp. 10-16), and an account of 'Cormorant Rock' (pp. 17-22), followed by a judiciously annotated list of the 291 species known to occur in the State. There is a supplemental list of 3 'Extirpated Species' and a 'Hypothetical List' of 10 species. The House Sparrow is included in the 291 species, and also the Painted Bunting, given as "an accidental visitant, or escaped cage bird," on the basis of a specimen taken in 1882. This latter species would have found a more fitting resting place in the Hypothetical List. The Blue Grosbeak is recorded under the head of 'Errata, Additions, etc.,' on p. 102, on the basis of a young bird taken by Mr. F. T. Jencks at Drownville, R. I., Oct. 12, 1899. It is, however, omitted from the Indexes. It is of interest to note that both the Purple and the Bronzed Grackle are given, the former as occurring in the southern and the latter in the northern portions of the State. *Ammodramus caudacutus subvirgatus*

¹The | Birds of Rhode Island. | By Reginald Heber Howe, Jr., | Member of the Nuttall Ornithological Club, | and | Edward Sturtevant, S. B., | Instructor of Natural Science at Saint George's School, Newport. | Members of the American Ornithologists' Union. | Illustrated. | 1899.—8vo, pp. 1-111, frontispiece and 5 halftone plates.

(p. 72) is said to be "Undoubtedly not an uncommon migrant with *A. nelsoni*," etc., which latter is, curiously, not otherwise mentioned. We have here, also, almost the only case where the changes in nomenclature made in the Ninth Supplement to the A. O. U. Check-List have not been followed in the present list.

As a whole, the list has evidently been prepared with great care and thoroughness of research. In the case of the rarer species, the original records are cited in footnotes, and there is, besides, an extended and practically complete bibliography of Rhode Island ornithology, numbering nearly two hundred entries. There are also two indexes, one for the technical names, and one for the vernacular and local names. The text is very tastefully printed, typographical errors are exceedingly few, and these are apparently all corrected in a list of errata at the close of the work. The six plates (only four of them are now first published) are pertinent of the subject, illustrating 'Purgatory,' at Middletown, where Barn Swallows breed in the rocks; Mount Hope, on Narragansett Bay; Cormorant Rock and Tern's nest; an Osprey nest; a Bank Swallow colony, and a Rose-breasted Grosbeak's nest. The work is attractive as a specimen of book-making, and in every way a credit to the authors. —J. A. A.

Newton's 'Dictionary of Birds.'¹—The reissue of this standard work in a cheaper form, yet unabridged and unchanged as regards the matter, will place it within reach of many who could not afford the original work. The paper is thinner and the volume less bulky, and thus more convenient for use, so that the cheaper form is in this respect rather an improvement upon the original. As the character of the work has already been placed before the readers of 'The Auk,'² we need only call attention to the fact of its reissue at reduced cost. This is especially gratifying, there being no other work of similar character extant. Professor Newton's masterly treatment of the general subject, and Dr. Gadow's contributions on the anatomy of birds, supply a fund of information alike valuable to the specialist and the general reader, and render the 'Dictionary' a compendium of ornithology of unrivalled excellence. —J. A. A.

¹A Dictionary of Birds. By Alfred Newton, assisted by Hans Gadow, with contributions from Richard Lydekker, Charles S. Roy, and R. W. Shufeldt. Cheap issue, unabridged. 1 vol. 8vo, pp. 1-124, i-viii, 1-1088, map, and numerous figures in text. The Macmillan Company, 66 Fifth Ave., New York. \$5.00.

²Vol. X, 1893, pp. 357-360; XI, 1894, pp. 56-60; XII, pp. 169, 170; XIV, 1897, pp. 234-244.

Cory's 'The Birds of Eastern North America. Part II. Land Birds.'¹ — Part II of Mr. Cory's 'Birds of Eastern North America' comprises the 'Key to the Families and Species of the Land Birds,' to which is added a list of all the birds of eastern North America. The 'Land Birds' are treated after the same plan as the 'Water Birds,' already noticed at some length in this journal (Vol. XVI, 1899, pp. 366, 367). There is the same lavishness of illustration and the same brevity of text, the illustrations in both cases forming the main basis of the work, these being so numerous and so well-chosen that the text may be considered as the thread that connects them and explains their application. In this respect the work is unique. Bills, wings, tails and feet are the parts chiefly figured, with a full-length illustration of at least one representative species for each genus. The Keys are founded primarily on size as indicated by the length of the closed wing, the land birds being divided on this basis into five 'groups,' which are subdivided into 'sections' according to the form of the bill or feet, etc.; these are subdivided, as occasion requires, on other characters.

In the order of make-up there is first an 'Index Key to Families' (pp. 131, 132); then the 'Key to Families' (pp. 133-148), in which the arrangement is wholly arbitrary, beginning with the Hummingbirds and ending with the larger game birds and the larger birds of prey. This is followed by the 'Key to the Species' (pp. 149-324), in which the families, with their genera and species, follow each other in natural sequence. The text under each is reduced to a brief statement of essential characters. Following the name of each species and subspecies is a reference by number to the 'List' that follows (pp. 325-387). This is a revised reprint of the author's previously published 'List of the Birds of Eastern North America,' which in arrangement and nomenclature follows strictly the A. O. U. Check-List. It comprises 500 species and 70 additional subspecies, all numbered consecutively, and each followed by a brief statement of its geographical range. The author in his 'Key to Families' of North American birds has certainly reduced the difficulty of identifying our birds to a minimum, and anyone so unfortunate as not to be able to identify his specimens, in any state of plumage, by Mr. Cory's 'Keys' may well give up the attempt in despair. — J. A. A.

'Avium Generum Index Alphabeticus.' — The British Ornithologists' Club has recently published "An Alphabetical Index to the Genera

¹The Birds | of | Eastern North America | known to occur East of the Ninetieth Meridian | — | Part II | — | Land Birds | — Key to the Families and Species | — | By | Charles B. Cory | Curator of the Department of Ornithology in the Field Columbian Museum Chicago . . . | — | Special Edition printed for the | Field Columbian Museum, Chicago, Ill. | 1899. — Large 8vo, pp. i-ix, 131-387, with several hundred illustrations in the text.

adopted in the twenty-seven volumes of the Catalogue of the Birds in the British Museum," prepared by Mr. F. H. Waterhouse, under the direction of Mr. Sclater. It was originally intended for private use, but its utility became so evident that the Club decided to print it as Volume IX of its Bulletin.¹ For this decision the Club deserves the gratitude of all working ornithologists. A list of the 27 volumes, with the titles in full, and date of publication, follows the Index, separately paged. The preface to the Index contains the following, which we are sure will interest not a few of the readers of 'The Auk':

"The following Latin lines were composed by a member of the B. O. C. to commemorate the names of the eleven authors of the 'Catalogue of Birds':—

DE CATALOGI AVIUM MAGNI SCRIPTORIBUS UNDECIM.

Sharpius incepit, scripsitque volumina multa;
Seebohmus sequitur, promptus ad auxilium.
 Teutonicus, zelo plenus, venit inde *Gadovus*,
*Salvinus*que bonam præbet amicus opem.
 Jam *Sclaterus* adest, tria longa volumina complens,
 Americanarum notus amans avium.
 Æpers *Hargittus* nunc Picos ordinat omnes,
*Hartertus*que sagax Cypselidas numerat.
 Multum etiam pensæ *Shelleyi* profuit ardor,
 Multum *Saundersi* mens operosa dedit.
 Clarus ab Italiâ jam *Salvadorius* adstat,
 et tandem *Grantus* fine coronat opus." — J. A. A.

Sharpe's 'Hand-List of the Genera and Species of Birds.'² — The present 'Hand-list' of birds is a worthy successor to that of the late George Robert Gray, published also by the Trustees of the British Museum, in the years 1869–1871, which for many years was so serviceable to working ornithologists, and which has not yet lost its usefulness. This new

¹ Bulletin of the British Ornithologists' Club. Edited by R. Bowdler Sharpe, LL. D. — Vol. IX, Avium Generum Index Alphabeticus. London: R. H. Porter, 7 Princes Street, Cavendish Square. April, 1899. — 8vo, pp. 1–31.

² A Hand-List | of the | Genera and Species | of | Birds | [Nomenclator Avium tum fossilium | tum viventium.] | By | R. Bowdler Sharpe, LL. D. | Assistant Keeper, Department of Zoology | British Museum | Volume I. | London: | Printed by order of the Trustees | Sold by | Longmans & Co., 39 Paternoster Row, E. C.; | B. Quaritch, 15 Piccadilly, W.; Dulau & Co., 37 Soho Square, W.; | Kegan Paul, Trench, Trübner & Co., Charing Cross Road, W. C.; | and at the | British Museum (Natural History), Cromwell Road, S. W. | 1899 | All rights reserved. — 8vo, pp. i–xxi + 1–303.

'Hand-list,' prepared by Dr. R. Bowdler Sharpe, the author of the greater part of the British Museum 'Catalogue of Birds,' has a distinct advantage over its predecessor, in the fact that in lieu of references to the original places of description of the genera and species, it is sufficient to refer only to the 'Catalogue of Birds,' on which it is avowedly based, except in the case of those described since the publication of the earlier volumes of the 'Catalogue'; in such cases reference is given to the original place of description. The 'Hand-list' is thus brought down to date, and as regards the groups embraced in the earlier volumes of the 'Catalogue,' published many years ago, forms a most valuable index to subsequent contributions to descriptive ornithology. It includes also, as an important feature, the extinct birds. On this point, says the author: "I have ventured to incorporate in what appears to me to be their natural position the extinct forms of birds; but it is difficult to discover all the descriptions of fossil birds, scattered as they are through so many publications. . . . The work in this direction has been principally founded on the 'Catalogue of Fossil Birds,' written by Mr. R. Lydekker, F. R. S., and published by the Trustees in 1891."

"The system of classification followed in the present work," says Dr. Sharpe, "is that proposed by myself in 1891, in my address to the Second Ornithological Congress at Buda-Pest. I have seen no reason to modify the conclusions there recorded in any material degree."

The nomenclature adopted is not in all cases that of the 'Catalogue,' although the departure is mainly in the line of giving a place in the 'Hand-list' to many forms ignored in the 'Catalogue,' even when not fully endorsed by the author of the 'Hand-list,' as under the genera *Lagopus* and *Bonasa* among the Grouse, and also elsewhere. The fossil forms are distinguished by the use of antique type. We note as new genera the following: *Mezotreron*, p. 56, for *M. dohertyi* Rothsch.; *Pseudaria*, p. 131, for *Uria columba*, *U. carbo*, and *U. snowi*; and *Nannopterum*, p. 235, for *Phalacrocorax harrisi* Rothsch. *Pallasicarbo* and *Psiloscoops* are given as "Coues, MSS., 1898," but both were published some months prior to the appearance of the present volume (see Osprey, III, May, 1899, p. 144).

It may be noted that there are no subgenera nor subspecies in the present work, all generic names having the status of full genera and all the 'forms' recognized under the generic names standing as full species.

Dr. Sharpe has evidently taken great pains to secure accuracy, having sent the proof-sheets of his 'Hand-list' to some twenty of the leading ornithologists in various parts of the world for their revision. He says: "I cannot too warmly express my thanks to the undermentioned ornithologists, who have revised the proof-sheets of this work, and given to it the importance of an international publication. Many of them have freely given me their original notes, have saved me from many slips, and have greatly enhanced the value of the work."

The present volume includes the Saururæ, the Rattitæ, and the Carinata from the Tinamiformes to the end of the Strigiformes, or the orders I-XXVI of Sharpe's classification. The printing of the second volume of this invaluable 'Hand-List' is well under way.—J. A. A.

Dubois's 'Synopsis Avium.'¹—Part I of Dr. Dubois's 'Synopsis Avium,' or 'Nouveau Manuel d'Ornithologie,' is in reality a 'hand-list,' constructed very nearly on the plan of that of the late G. R. Gray, rather than a 'manuel' in the sense in which this term is commonly employed. The species and subspecies are numbered consecutively, but under two distinct series of numeration. Part I, comprising the Psittaci, Scansores, and Pici, consisting of 80 pages, includes 1105 species and 273 subspecies, referred to 180 genera. References are usually given to illustrations, when such exist, but rarely to place of original description, and synonyms are cited with simply the name of the author. It is evidently prepared with thoroughness and care, and its usefulness will be limited only by the plan of construction.

From the prospectus we learn that the 'Synopsis' will appear in quarterly parts, of nominally 96 pages of text, or, as in Part I, of 80 pages and a colored plate, the plate taking the place of 16 pages of text. The "several colored plates" that are to appear in the course of the work will represent new or hitherto unfigured species. The subscription price is 6 francs per part, up to the completion of the third part, when the price, for new subscribers only, will be raised to 9 francs per part. The work is to comprise about seven parts. It is beautifully printed and will be a valuable contribution to ornithological literature.—J. A. A.

Salvadori and Festa on Birds of Ecuador.²—This is Part I of a report on Dr. Festa's collection of birds, numbering nearly 3000 specimens and representing over 600 species, made by him during three years spent in exploring various parts of Ecuador. The present paper relates only to the Oscines, of which 165 species are enumerated. Of these 5 are described as new and 10 others are reported as new to Ecuador. The new species are (1) *Turdus conradi*, (2) *Thryophilus leucopogon*, (3) *Certhiola intermedia*, (4) *Spermophila equatorialis*, and (5) *Cyanolyca angeles*.

¹ Synopsis Avium. Nouveau Manuel d'Ornithologie. Par Alphonse Dubois, Docteur en Sciences, Conservateur au Musée Royal d'Histoire naturelle de Belgique, etc. Fascicule I. Psittaci, Scansores, Pici. Bruxelles: H. Lamertin, éditeur, 20 Rue du Marché-au-bois. 1899. New-York, chez M. G.-E. Stechert, 9 East 16th St. 4to, pp. 80, and 1 col. plate. Six francs, or \$1.20, per part.

² Viaggio del Dr. Enrico Festa nell'Ecuador. T. Salvadori ed E. Festa. Uccelli, Parte prima — Passeres oscines. Boll. Mus. Zool. ed Anat. comp. d. R. Univ. di Torino, XV, N. 357, pp. 1-31, Aug. 10, 1899.

The annotations give references to previous Ecuadorian records for the species, and also the sex, date of collection and locality of the specimens, the color of the bill, etc., in life, with remarks on variations of plumage. This report on Dr. Festa's work thus forms a most important contribution to South American ornithology. — J. A. A.

Bangs on Birds from the Sierra Nevada de Santa Marta, Colombia.¹— This is Mr. Bangs's fourth paper on the birds of this region, and relates to collections made by Mr. Wilmot W. Brown, Jr., from January to April, 1899, at altitudes varying from 3,000 to 15,000 feet. The list includes 68 species, of which 13 are described as new, namely: (1) *Pharomachrus festatus*, (2) *Metallura districta*, (3) *Ochthodiate pernix*, (4) *Hapalocercus paulus*, (5) *Myiopatis montensis*, (6) *Pipreola aureipectus decora*, (7) *Sclerurus albigularis propinquus*, (8) *Conopophaga browni*, (9) *Scytalopus latebricola*, (10) *Haplospiza nivalia*, (11) *Cinclus rivularis*, (12) *Troglodytes monticola*, (13) *Merula albiventris fusa*. The list relates for the most part to species not previously taken by Mr. Brown, but additional specimens of some of the rarer forms are recorded. Thus an additional specimen of Mr. Bangs's *Leucuria phalerata* (figured in 'The Auk,' XVI, 1899, plate ii), previously known to Mr. Bangs only from the type, is reported. This is doubtless not a rare species at favorable localities, the American Museum of Natural History having received five specimens in a collection made by Mr. H. H. Smith in the same general region. These specimens show that the tail is not always pure white, being considerably shaded with dusky in immature birds. — J. A. A.

Pearson's Preliminary List of Birds of Chapel Hill, N. C.²—As the title implies, this List is put forth as only an imperfect enumeration of the birds occurring at Chapel Hill, North Carolina. The period of observation is comparatively brief, and the species listed number only 132, but include only such as have been observed and positively identified. The annotations relate mainly to the seasons and manner of occurrence of the species noted. It is therefore a good list as far as it goes, but it is unfortunately marred by careless proofreading. — J. A. A.

Kellogg's List of Biting Lice (Mallophaga) taken from North Ameri-

¹ On Some New or Rare Birds from the Sierra Nevada de Santa Marta, Colombia. By Outram Bangs. Proc. Biol. Soc. Washington, XIII, 1899, pp. 91-108. Nov. 11, 1899.

² Preliminary List of the Birds of Chapel Hill, N. C., with brief notes on some of the species. By T. Gilbert Pearson. Journ. of the Elisha Mitchell Sci. Soc., Vol. XVI, part 1, 1899, pp. 33-51.

can Birds and Mammals.¹ — A list of the known North American species of the order Mallophaga is not only here given, with references to the place of original description, and the name of the host, but there is also a separate list of the hosts, with the name of the species of parasite infesting each host species. The North American species thus far recorded number 282 species, representing 18 out of the 21 recognized genera of the order. Of these 264 species infest birds, and 18 are known only from mammals. Mallophagous parasites have been recorded from 257 species of North American birds, belonging to 167 genera. As 107 species of North American Mallophaga were described from European hosts, the question of their distribution is one of special interest,² as in many cases the same parasite is found on hosts that are not only not congeneric, but which do not occur on the same continent. Often the same species occurs on several different hosts, while not unfrequently three or more species of Mallophaga occur on the same host species, sometimes as many as eight or ten, representing as many as five genera. In some instances the same parasite has been recorded from birds differing greatly in habits, and belonging even to different orders. As the subject is of interest to both ornithologists and entomologists, it seems desirable to quote in this connection from a recent letter from Prof. Kellogg, to the present writer, as follows: "As I can only get specimens of Mallophaga from bird collectors — that is, I have not yet come to the point where I can shoot birds simply for the sake of collecting their parasites — you see what assistance the readers of 'The Auk' can be to me." He also states that he has received in this way "some specimens, and has been promised others."

In discussing elsewhere (*Psyche*, *l. c.*) this problem in distribution, Prof. Kellogg has thus formulated his conclusions: "... On this fact I base my belief that the occurrence of a parasite species common to several hosts under circumstances which do not admit of the migration of the parasites from bird to bird is due to the persistence of the parasite species unchanged from the common ancestor of the two or more now distinct but closely allied bird species. With the spreading of the ancestral species, geographical races have arisen within the limits of the species which have with time and with isolation, caused by newly appearing geographical barriers due to geologic or climatic changes, come to be distinct species — species often distinguished only by superficial differences in color and markings of plumage, etc. The parasites have

¹ A List of the Biting Lice (Mallophaga) taken from Birds and Mammals of North America. By Vernon L. Kellogg, M. S., Professor of Entomology, Leland Stanford Junior University. Proc. U. S. Nat. Mus. Vol. XXII., No. 1183, 1899, pp. 39-100.

² See Kellogg (V. L.), 'A Problem in Distribution,' *Psyche*, VII, Aug., 1898, pp. 243-247.

remained practically unaffected by the conditions which have produced the differences among the birds; the temperature of the host's body, the feathers as food, all of the environment of the parasite is practically unchanged. The parasitic species thus remains unchanged, while the ancestral *Larus* or *Anas* species becomes differentiated into a dozen or score of specific forms, all with a common parasite. If this proposed solution of the problem may be accepted, it introduces a factor into problems of distribution, where parasites are concerned, which I do not recall having seen presented before."—J. A. A.

Thompson on the Cranial Osteology of the Parrots.¹—"To discover anatomical characters such as might yield or help to yield a natural classification of the Parrots has been the desire of many ornithologists, but the search has availed little."

Professor Thompson's line of research is a detailed study of the quadrate, the auditory region, and particularly of the orbital ring as regards its completeness or incompleteness, and the cranial bones taking part in its formation. These are the lachrymal, or prefrontal as Prof. Thompson prefers to call it, the postorbital or postfrontal, and the squamosal, and the changes are so rung that when a suborbital ring is present it may be formed by the prefrontal and postfrontal, the prefrontal and squamosal, or, as in the Cockatoos, all three may unite, thus forming a supratemporal fossa. The conditions prevailing in many members of the various families and subfamilies admitted by Mivart are discussed in considerable detail, but while additional emphasis is given to the family rights of *Stringops* and *Nestor*, Prof. Thompson has given us no summary of his own conclusions, leaving us to make our own applications of the points he has given. The paper is most valuable, embodying as it does the results of long study, but it again emphasizes the familiar fact that among birds minor structural variations are so great that it is practically impossible to find any one character by means of which even small groups may be separated.—F. A. L.

Lange's 'Our Native Birds, How to Protect them and Attract them to Our Homes.'²—As the title explains, this is a popular bird book on rather new lines, it being devoted to an exposition of how to protect birds and to promote their increase in the vicinity of our homes. The first section of the work relates to the decrease in both song and game birds and

¹ On Characteristic Points in the Cranial Osteology of the Parrots. By D'Arcy W. Thompson, C. B., F. Z. S. Proc. Zool. Soc. London, Jan., 1899.

² Our Native Birds | How to Protect them and Attract | them to our Homes | By | D. Lange | author of "Handbook of Nature Study" | Instructor in Nature Study in the Public Schools | of St. Paul, Minnesota | With Illustrations | New York | The Macmillan Company | London: Macmillan & Co., Ltd. | 1899 | All rights reserved.—12mo, pp. xii + 162. \$1.00.

the various causes, preventable and otherwise, which have led to this sad result. Section IV treats of the protection of song birds, and suggests various means for promoting their increase, particularly in the vicinity of our homes. The titles of the chapters under this section indicate the means suggested, as follows: Chapter I. 'By furnishing them Trees, Vines, and Shrubs. Flowers for Hummingbirds. General Suggestions for Tree-planting for Birds. Rural Schools and Nature.' Chapter II. 'Provide Nesting-boxes. Do not cut down every Hollow-tree.' Chapter III. 'Provide Drinking and Bathing Fountains.' Chapter IV. 'Feeding Birds in Winter and in unfavorable weather at other seasons.' Chapter V. 'Miscellaneous. Dust Baths, Gravel, and Lime.' Chapter VI. 'Protecting Birds from their Natural Enemies.' Chapter VII. 'The English Sparrow Question.' Chapter VIII. 'Birds on Hats, Boys, Collectors, So-called Bird Students, Bird Hunters, Ubiquitous Gunners.' Chapter IX. 'Song Birds as Food.' Sections V and VI relate to 'Education and the Birds'; especially to the awakening of an intelligent and kindly interest in birds on the part of school children, through 'bird day' exercises in schools, and by other means. 'The Birds before Uncle Sam' is a contribution to a bird day program, in which 'Uncle Sam' is supposed to hear the complaints of the birds and to give judgment in their behalf, the birds being personated by boys and girls in appropriate costumes. Section VIII discusses 'Game Protection from the Nature Lover's Point of View'; and the concluding Section IX gives a variety of useful information about magazines more or less devoted to bird protection, the care and protection of forests, and allied topics; Audubon Societies, Game Protective and Humane Associations, a list, with addresses; the U. S. Department of Agriculture, its various divisions, their work and publications; list of Agricultural Experiment Stations in the United States and Canada; and, finally, a list of books helpful to beginners in bird study. The work is thus novel in conception, and should be extremely helpful to those interested in the development of nature study in schools and in the education of the general public. It also not only urges bird protection but furnishes suggestions in respect to providing food and favorable breeding places for birds whose surroundings have become more or less untenable through the necessary changes in environment due to man's agency. — J. A. A.

Macpherson's 'History of Fowling.'¹—A bibliographical notice of 'The Literature of Fowling' occupies pp. xiii–xxv of the 'Introduction,'

¹ A | History of Fowling | being an account of the many curious | devices by which Wild Birds are or | have been captured in different parts of the world | By the | Rev. H. A. Macpherson, M. A. | Member of the British Ornithologists' Union, author of | "The Fauna of Lakeland," etc., joint author of | "The Fur and Feather Series," etc. | [Vignette.] Edinburgh: David Douglas | MDCCCXCVII. | All rights reserved.—Large Svo, pp. liv+511, pll. v, and nearly 200 text figures.

and is followed (pp. xxv-xl) by a historical résumé of 'The Art of Fowling.' In the main body of the work (pp. 1-502) the subject matter is arranged systematically, beginning with the Corvidæ and ending with the Apterygidæ.

The art of fowling dates from the highest antiquity, its origin being prehistoric, and is as characteristic of barbarous tribes in remote islands and inaccessible regions as of civilized nations. The means vary with the species of bird it is desired to capture, both among wild tribes and in civilized countries. For the most part, however, fowling is a thing of the past; while it flourished in Europe in early times and is still practiced here and there as an amusement or for profit, "the Italians appear to be almost the only European people who still regard the resources of fowling as affording a prime amusement, to be enjoyed by all classes as opportunity permits." Among the more important devices employed are traps and snares, in great variety, and bird lime and nets, also of various kinds. Mr. Macpherson has brought together a vast amount of curious and interesting information, relating to almost all countries and peoples, and to all classes of birds from Larks and Sparrows to Water Fowl and Ostriches. His pages are also enriched with abundant illustrations, showing the nature and use of the multifarious devices employed for entrapping wild birds. Many of these are reproductions from old works on fowling, but many are after original designs, prepared especially for the present volume. A wide field is here well covered, the author having bestowed upon his task much time and a vast amount of careful research.—J. A. A.¹

Mrs. Wright's '*Wabeno, the Magician*.'²—This is another of Mrs. Wright's admirable nature books for the young, in which the phenomena of nature, both animate and inanimate, are explained in the delightfully informal and seductive way so characteristic of the author of '*Tommy-Anne*,' of which deservedly popular work this is the happy sequel. While treating of nature in a broad sense, it is rather more than incidentally ornithological, the birds, the beasts, the insects, and the plants, and the forces of nature receiving about equal attention.—J. A. A.

¹ This work was received in November, 1897, but by accident was mislaid and overlooked for two years, which explains the much regretted lateness of this notice.

² *Wabeno the Magician*. | The Sequel to | "Tommy-Anne and the Three Hearts" | By | Mabel Osgood Wright | Author of "Birdcraft," "The Friendship of Nature" | etc., etc. | Illustrated | by Joseph M. Gleeson | New York | The Macmillan Company | London: Macmillan & Co., Ltd. 1899. All rights reserved.—8vo, pp. xi+346. \$1.50.

Bumpus, on 'The Elimination of the Unfit.'¹—Professor Bumpus has availed himself of the opportunity to contribute to the establishment of the hypothesis of natural selection by the use of material furnished to his hands by the great storm of Feb. 1, 1898, at Providence, R. I., in the form of 136 House Sparrows which, as victims of the storm, were brought to the Anatomical Laboratory of Brown University. Of these 72 revived and 64 perished. A careful study of these birds by means of detailed measurement, as of length, alar extent, the length of head, humerus, femur, tibio-tarsus, etc., revealed the fact that in the birds that died a larger proportion departed from the average or normal standard in one or more ways than was the case among those that survived. Hence Prof. Bumpus concludes: (1) . . . that the birds which perished, perished not through accident, but because they did not possess certain structural characters which would have enabled them to withstand the severity of the test imposed by nature; they were eliminated because they were unfit. (2) The process of relative elimination is most severe with extremely variable individuals, no matter in what direction the variations may occur. It is quite as dangerous to be conspicuously above a certain standard of organic excellence as it is to be conspicuously below the standard. It is the *type* that nature favors. (3) Disregard of structural qualifications finally produces a throng of degenerates, whose destruction will follow the arrival of adversity." The data on which the conclusions rest are presented in detail, mostly in the form of tabulated measurements.—J. A. A.

Whitman on 'Animal Behavior.'²—In his very suggestive paper on 'Animal Behavior' Professor Whitman has made a most valuable contribution to the subject of Instinct and its relation to Intelligence. It is the outcome of elaborate and most careful study of the 'behavior of animals,' both of low and of high organization, as the leeches of the genus *Clepsine*, of the large fresh water salamander of the genus *Necturus*, and various species of Pigeons. The behavior of these different animals under varying conditions is detailed at length, and its meaning and bearing on the origin and relations of instinct and intelligence are most lucidly discussed, in connection with the leading hypotheses on the subject.

Not long since it was a more or less generally accepted theory that instincts were simply inherited habits. Recently, as Prof. Whitman notes, this theory has been abandoned as inadequate by some of its

¹The Elimination of the Unfit as illustrated by the Introduced Sparrow, *Passer domesticus*. A Fourth Contribution to the Study of Variation. By Hermon C. Bumpus, Biological Lectures delivered at the Marine Biological Laboratory of Wood's Holl. Session of 1897 and 1898 (1899) pp. 209-226.

²Animal Behavior. By C. O. Whitman. Biological Lectures of the Marine Biological Laboratory, Wood's Holl, Mass., 1898 (1899), pp. 285-338.

former chief advocates, who have come to adopt the view that instinct is a product of evolution. We have not space to go over the evidence at length, but would commend to those interested Prof. Whitman's able exposition of the subject. From his summary of the subject, we quote somewhat at length. Under the heading 'A Few General Statements' (pp. 328-331), he says:

"1. Instinct and structure are to be studied from the common standpoint of phyletic descent. . . . Instincts are evolved rather than involved (stereotyped by repetition and transmission), and the key to their genetic history is to be sought in their more general rather than in their later and incidental uses.

"2. The primary roots of instincts reach back to the constitutional properties of protoplasm, and their evolution runs, in general, parallel with organogeny. As the genesis of organs takes its departure from the elementary structure of protoplasm, so does the genesis of instincts proceed from the fundamental functions of protoplasm. Primordial organs and instincts are alike few in number and generally persistent. . . .

"3. Remembering that structural bases are relatively few and permanent as compared with external morphological characters, we can readily understand why, for example, five hundred different species of wild pigeons should all have a few common undifferentiated instincts, such as drinking without raising the head, the cock's time of incubating from about 10 A. M. to about 4 P. M., etc. . . .

"5. Instinct precedes intelligence both in ontogeny and phylogeny, and it has furnished all the structural foundations employed by intelligence. In social development also instinct predominates in the earlier, intelligence in the later stages.

"6. Since instinct supplied at least the earlier rudiments of brain and nerve, since instinct and mind work with the same mechanisms and in the same channels, and since instinctive action is *gradually* superceded by intelligent action, we are compelled to regard instinct as the actual germ of mind.

"7. The automatism, into which habit and intelligence may lapse, seems explicable, in a general way, as due more to the preorganization of instinct than to mechanical repetition. . . . Habits appear as the uses of instinct organization which have been learned by experience. . . .

"9. We are apt to contrast the extremes of instinct and intelligence — to emphasize the blindness and inflexibility of the one with the consciousness of the other. It is like contrasting the extremes of light and dark and forgetting all the transitional degrees of twilight. . . . Instinct is blind, so is the highest human wisdom blind. The distinction is one of degree. . . ."

Prof. Whitman's experiments with various species of Pigeons, which he has made the subject of special investigation in this connection, are of the highest interest and we regret lack of space prevents our summarizing them in the present review. — J. A. A.

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NOTES AND NEWS.

DR. ELLIOTT COUES died at the Johns Hopkins Hospital, Baltimore, Md., Dec. 25, 1899, as the result of a grave surgical operation performed on Dec. 6, after several months of seriously impaired health, at the age of 57 years.

Dr. Coues was not only one of the Founders of the American Ornithologists' Union, but one of the self-constituted committee of three that sent out the call for a congress of ornithologists that resulted in the founding of the Union. He was at one time its President, and always one of the most valued and influential members of its Council, and of the Committee on the Nomenclature and classification of North American Birds, drafting considerable portions of its 'Code of Nomenclature,' and acting with the Committee in the preparation of both editions of the Check-List and its various Supplements. As an all-around ornithologist, his position was in the first rank of the cultivators of this science, and his influence upon the progress of technical ornithology in America is second only to that of the late Professor Baird, of whom he was a pupil; while in popularizing the subject his influence has been far greater than that of any other writer. His 'Key to North American Birds,' published in 1872, was a popular handbook that opened an easy path to would-be students of ornithology. His enthusiasm, remarkable facility of expression, vivacity of style and originality of thought always enlivened his writings, however technical the subject, and imparted to his bird biographies a charm and vividness few writers can hope to attain.

It is with the deepest sorrow that we have to record the loss of one so eminent in the annals of our science, while still at the height of his powers; his death will be felt as a personal loss by all the members of our Union and as a grave loss to our science. He was kind-hearted and helpful, of great tenacity of purpose, impulsive and imaginative, sometimes aggressive, and not always discreet in his methods of controversy. His capacity for work was almost phenomenal, and there was a decided touch of genius in his mental organism. His friendships were firm and lasting, and he did not easily forget an injury, whether fancied or real.

In accordance with a standing order of the Union respecting deceased Active Members (see *Auk*, XII, p. 199), a special memorial of his life and work will be presented at the next meeting of the American Ornithologists' Union, and published later in 'The Auk.'

DR. D. WEBSTER PRENTISS, one of the Founders of the American Ornithologists' Union, and for twelve years an Active Member, died at his home in Washington, D. C., Nov. 19, 1899, at the age of 56 years. Owing to failing health, he resigned his Active Membership in 1895, and

on the acceptance of his resignation he was reelected as a Corresponding Member.

Dr. Prentiss was born in Washington in 1843, and was a graduate of the Columbian University and of the University of Pennsylvania, where he took his medical degree. He served with distinction as a surgeon in the civil war, and later became one of the best known and ablest physicians of Washington. For many years he also held the chair of *Materia Medica* and Therapeutics in the Columbian Medical College, which he filled with marked ability, and was beloved and revered by his students. He published much on medicine and surgery, and was a good naturalist. His chief ornithological publication was 'A List of Birds ascertained to inhabit the District of Columbia,' etc. (1862), with Dr. Coues, a second edition of which, under the title '*Avifauna Columbiana*,' appeared in 1883. He never lost his interest in ornithology, but the exacting demands of his profession prevented his devoting much time to strictly ornithological work.

MR. W. W. COLBURN, an Associate Member of the American Ornithologists' Union, died suddenly of heart failure at his home in Springfield, Mass., Oct. 17, 1899, at the age of 60 years. Mr. Colburn was born at New Boston, N. H.; and was graduated from Dartmouth College in 1861. Later he was a teacher in the Lawrence Academy at Groton, Mass. For twelve years he was principal of the High School at Manchester, N. H., and in 1874 became principal of the High School at Springfield, Mass., which position he held till 1890. After his retirement he received private pupils and conducted classes in natural history. He was greatly respected, and one of Springfield's best loved citizens, taking a prominent part in the social and educational life of the city. "He was perhaps the best ornithologist of the section, and his services in spreading popular instruction concerning our songbirds and in awakening a sentiment against their destruction and their use in millinery had been most valuable. He had been president of the Peabody Society, which has for its aim the protection of our native birds." In conjunction with Mr. Robert O. Morris, he published in 1897 a nominal list of 203 species of wild birds observed in Forest Park, Springfield, Mass., in the Report of the Park Commissioners for that year.

ONE OF the pleasantest episodes of the Seventeenth Congress of the A. O. U. was the receipt of a gift to the Union of \$100, from Miss Juliette A. Owen of St. Joseph, Mo., an Associate Member of the Union, which she desired the Council to devote to such use as seemed to it most fitting. While the sum is not large, comparatively speaking, it is most auspicious and encouraging. The subject of raising a fund in aid of ornithological research is one that has been often considered by at least individual members of the A. O. U. Council, and some little effort was at one time made to initiate such a desirable movement. Nothing, how-

ever, resulted from it, and no formal action was ever taken in the matter, until Miss Owen's unsolicited gift gave impetus to this long-cherished scheme. On the receipt of Miss Owen's gift the Council appointed a committee to consider its disposition, resulting in a report recommending that the money he made the nucleus of a fund, the proceeds of which should be devoted to the purpose already stated. In all undertakings it is the first step that counts, hence the hopefulness of the present outlook for the establishment of a fund "for the advancement of the science of ornithology." There is now both reason and ground for an appeal for further contributions toward this end; and it is hoped that this bare statement of the conditions of the case will be sufficient to prompt further and still larger gifts toward the realization of a purpose so desirable.

AN IMPORTANT monograph of 'The Birds of Cheshire,' by T. A. Coward and Charles Oldham is announced for publication early in the spring by Messrs. Sherratt and Hughes, 27 St. Ann Street, Manchester, England. It will be an octavo of upwards of 250 pages, with six plates depicting bird haunts, and a map. The main part of the work will treat of "all the birds known to occur in Cheshire," with an introductory chapter on various special topics relating to the general subject. It is to be published by subscription, at 10s. 6d. net.

ANOTHER work on British birds, announced as about to appear, is 'The Birds of Glamorganshire,' by Digby S. W. Nicholl, in demy 8vo, also to be published by subscription, at 7s. 6d., or 7s. 9d. by post. Orders should be sent to Thomas Carter, 8 High Town, Hereford, England.

MR. REGINALD HEBER HOWE, JR., announces that he "proposes to edit, if enough subscribers are secured to insure success, a quarterly ornithological paper," to be called 'Randon Notes on Ornithology,' "to consist of from four to eight pages, composed of general articles and notes." The subscription price is 75 cents, due after the publication of the first issue. Mr. Howe's address is Longwood, Brookline, Mass.

'THE CONDOR' is the new name chosen for 'The Bulletin of the Cooper Ornithological Club,' which enters on its second volume with the beginning of the year 1900. We trust that the good record it has made during the first year betokens for 'The Condor' a long life and permanent prosperity.

THE PROSPECTUS of 'Bird-Lore' for 1900 promises to "set a new standard for popular natural history journals. The articles will be largely by recognized leaders in the world of science and letters, and of a variety which cannot fail to create wide interest." The list of contributors announced seems to make good the claim thus set forth. In connection with the journal the author has established an 'Advisory Coun-

cil' to assist bird students by placing them in "direct communication with an authority on the bird-life of their region who has consented to aid them," the announcement of which Council will be made in the next issue of 'Bird-Lore.'

IT is announced that 'The Oölogists Association' proposes to hold its first meeting, probably in Washington, at some yet to be assigned date next fall. The Secretary-Treasurer of the Association is John W. Daniel, Jr., Lynchburg, Va.

THE magnitude of the business of destroying birds for millinery purposes has recently been illustrated through the accidental destruction by fire at Wantagh, Long Island, N. Y., Nov. 22, 1899, of a factory for the preparation of the skins and plumage of birds "for the purpose of ornamenting women's hats." This establishment is said to have been the largest of its kind in the United States; it was a one story building, 100 feet long and fifty feet wide, in which about fifty persons were employed in the preparation of birds' plumage for the milliner. At the time of the fire the stock is said to have contained "10,000 stuffed sea gulls, 20,000 wings of various other birds, 10,000 heads of birds, representing many varieties from the beautiful plumaged birds of the South to the plain Long Island Crow. The resources of the establishment had been severely taxed during the past year to provide long wings and single feathers, and a number of special gunners were sent out to provide a supply of those birds that would meet the demand. Long Island baymen all last winter made more money shooting birds for Mr. Wilson than they did at their regular callings of oyster gathering or fishing. The establishment had men stationed at Cape Cod, the islands off the coast of Maine, the shores of Virginia and on the Florida coasts. These men were kept busy filling special orders for certain varieties of birds found in those localities." A few days before the fire "several gunning outfits were sent out from the establishment for the winter's work. One party went out in a big sloop to secure a cargo of water fowl of different sorts, and another party was sent south with a naphtha launch to explore southern rivers for birds, and the Florida coasts will be hunted by still another outfit. Some of these gunners kill a large number of birds in a season. The greatest record made by any one man was 141,000 killed in a single season in Florida."

The owner of this establishment is William L. Wilson, and it is announced that he will at once rebuild his plant. His nefarious work has long been known to our bird protectors, and various attempts have been made to entrap him in the meshes of the law, but through defects in the New York bird law he has always, by the aid of able lawyers, found a loophole for escape. The wide publicity given to his work by the press in describing the destruction of his factory should have the effect to arouse public sentiment against it, and greatly increase the danger

of prosecution to his paid emissaries, particularly in Florida, where, we are informed, the publication of the facts above given have aroused a sentiment that should result in materially checking his work in that State. An effort will also be made to secure a passage of a law by the incoming legislature of New York, which shall render it impossible for such work be carried on with safety in this State.

It is disheartening to bird protectionists to find in the public press statements to the effect that few wild birds are now employed in millinery decorations, which are, it is claimed, made up principally from the plumage of domesticated fowls and game birds killed as food. Even the aigrettes are said to be obtained without killing the birds, the plumes being either picked up from the ground after the birds have shed them, or obtained from egret-farms, just as ostrich plumes are obtained by ostrich farming. It is pretty safe to assume, though hard to prove, that such statements as these emanate from an interested source, and are put forth to dull the sense of the public to the real facts in the case. The 'general public' is unable to discriminate in matters of ornithology, and to a large extent believes what it is intended it should believe by the interested authors of such misinformation. A survey of women's head-gear, as the average woman appears in public, is a painful sight to the ornithologist, who at a glance can tell the source of these hat decorations, however mutilated and disguised, with reasonable certainty, and can realize to what an enormous extent our wild birds are still sacrificed for woman's defacement. Not only are Hawks and Owls, Terns and Gulls, Grebes and Herons, and other birds in nameless variety, but even the Brown Pelican and Turkey Buzzard are made to contribute to the barbaric display.

But worst of all is the fact that high-toned and respectable fashion journals will publish statements like that given below and fail not only to retract them when shown their erroneous and harmful character. As an example we call attention to the following: "The tender-hearted women who have refused to wear egrets on their hats and bonnets, on account of the poor mother-birds, will be glad to learn that they are not killed for the purpose of obtaining these lovely ornaments. As a matter of fact, the hunters, without powder or shot, go around (in South America or India) during the right season to the breeding or roosting grounds and collect the plumes which are cast by the male every year.

"In Venezuela the natives are beginning to farm the birds, as they are easily domesticated; and as the egrets grow again each year, the enterprise should be very profitable.

"It has long been considered a very cruel thing to wear an egret, as it was supposed that a mother-bird was killed to obtain it. We have heard harrowing descriptions of nests of young birds left unprotected while the mother-birds lay mangled on the ground—all for the adornment of heathen woman-kind. But now the most tender-hearted lady (provided

she can afford the luxury) may wear this beautiful ornament with a clear conscience."

The above is from the editorial page of 'Harper's Bazar,' of Nov. 18, 1899. It was presumed that it was put forth innocently and in ignorance of the facts, and that a respectful and courteous presentation of the truth in the matter would be not only welcomed, but would lead to a proper retraction of the erroneous statements. Not only has this not been the case, but the courtesy of even an acknowledgment of such communications, sent as private letters and not for publication, has not been vouchsafed. The inference is that no great compunction of conscience was felt on the part of the management of this leading fashion journal for a most inhumane misstatement of facts in the matter of how egret plumes are obtained for millinery use. The various reports of egret farms, located in such improbable places as Arizona, New Mexico, Venezuela, etc., have in each case proved upon investigation to be wholly mythical, as any ornithologist would expect; and, as ornithologists also know, the reported gathering of shed egret plumes as a source of millinery supply, must, in the nature of things, be equally imaginary.

APPROPOS of the above related incidents Mr. Witmer Stone, Chairman of the A. O. U. Committee on the Protection of North American birds, has prepared a two-page circular devoted to a brief summary of the facts in relation to how aigrettes are really obtained. A large edition of this circular has been issued for general distribution by the Pennsylvania Audubon Society. This is a prompt and praiseworthy effort to offset the harm that must necessarily result from such cruel misstatements, sent broadcast throughout the world, as that above quoted from 'Harper's Bazar.'

The matter has also been taken up by Mr. Chapman in the New York 'Tribune' of Dec. 28, 1899, from which it appears that the 'Harper's Bazar' editorial was based on 'hearsay evidence,' which was allowed credence in the face of the facts so well known to be entirely adverse to such allegations.

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THE IVORY-BILLED WOODPECKER IN LOUISIANA.

BY GEO. G. BEYER.

ABOUT three years ago I was engaged in Franklin Parish, Louisiana, on certain archæological investigations, but having considerable time to spare, I also took some notice of the bird-fauna of that section of the State, without establishing, however, any special records worthy of notice, with the exception of certain reports of the occurrence of the Ivory-billed Woodpecker (*Campophilus principalis*) in an almost inaccessible swamp, which extends from the most northern portion of Franklin Parish, between the Tensas River and Bayou Maçon, to Black River. All efforts to obtain verification of these reports were unsuccessful at the time, but upon my return to North Louisiana last July, a gentleman handed me the dried head of a female Ivory-bill, informing me at the same time that, owing to the long-continued drouth, he could guide me to the spot where he had shot it and had seen several others.

As the locality was far removed from any human habitation, it became necessary to fit out a regular camping party, and a few days after I started for Big Lake, a large body of water in the midst of a heavy cypress swamp. The borders of the lake as well as the banks of some of the larger cross-bayous are heavily

timbered with ash, oak and elm. In some of such localities are the homes of the Ivory-bills, and from them they do not appear to stray very far, in fact, I was assured that the range of a pair of these birds does not extend more than a mile from their nest.

As soon as we approached the vicinity of Big Lake we could hear quite frequently the rather plaintive but loud cry of the 'Log-god,' for such the bird is called by those acquainted with it in that section of the State.

The accounts of the habits of this species seem to be considerably at variance. Audubon, for instance, states that the Ivory-bill is never silent, but utters his cry at almost every moment of the day, and then never while on the wing; he furthermore says that it never excavates its nest in a dead tree. On the other hand the late Captain Bendire quotes from one of his informers in his monumental 'Life-histories of North American Birds' exactly the opposite. In the paragraphs referred to, Mr. McIlhenny observes that the Ivory-bills are exceedingly silent, and that he had never heard them excepting when in flight.

From the observations made on our hunt after these birds, I found Audubon's statement correct in so far that, if unmolested and not alarmed, they are certainly noisy, and by their oft-repeated cry we became accustomed to locate them. But when Audubon states that they never build in dead or even dying trees, he certainly was mistaken, for I took one pair with one of their progeny (a young male fairly well feathered) from the nest situated in an old and nearly rotten white elm stump, a little over forty feet from the ground. The entrance to the nests never seems to be as circular as that of other Woodpeckers, but is a little wider than high; moreover, this appearance is greatly augmented by the peculiar and ingenious way of slanting the lower edge of the hole for the purpose of shedding the rain, which otherwise would occasionally beat in. We found and examined several nests, but noticed only one, about twenty-five feet from the ground, in a living over-cup oak. The excavation, however, was rather small, being only a trifle over nine inches deep and eight inches high. We might, in this instance, have doubted the identity of the nest but for the fact of finding two body feathers of an Ivory-bill among the sawdust in the bottom.

Of the breeding habits I could not learn anything at the time, except that I believe only one brood is raised, and that the old birds continue to feed and care for their young long after they are able to take care of themselves. It was then near the middle of July, and old and young birds were still together, and the attention of the old ones was too entirely taken up by the young to have a chance of preparing for a second generation.

The Ivory-billed Woodpecker, in Audubon's time fairly common, is now fast disappearing, and I doubt the existence in our State of another locality where it could be found at the present day, and even in that swamp where I hunted them, they are not uniformly distributed but are confined to two or three localities in the vicinity of Big and Hog Lakes.

Our hunt was quite successful, as I obtained seven specimens in fairly good plumage. The old pair which I found with one of their young in the nest, I mounted with all their belongings. As stated before, this nest was located about forty feet from the ground, and the entrance was nearly hidden by the leaves of the poison ivy (*Rhus radicans*) which had totally covered the lower portions of the old stump. The entrance measures exactly $4\frac{1}{4}$ inches in height and $3\frac{7}{8}$ inches in width. The cavity itself is only nine inches deep and seven and a half inches in height.

The bottom of the nest was covered to the depth of about an inch with fine wood chips and rotten wood dust. The interior was very clean, and every sign of excreta and other household debris had been carefully removed. There was but one young one about, and it remained in close vicinity of the entrance, notwithstanding that it was almost fully feathered and able to fly. Both parents were still feeding it.

CARE OF NEST AND YOUNG.

BY FRANCIS H. HERRICK.

THE sanitary condition of the nest is a matter of great concern to birds, who, as a class, are probably the cleanest of animals. This is especially true of all who breed in holes like Woodpeckers and Chickadees, the young of which are piled up in close quarters and often more than one layer deep. The Woodpecker's hole and the Bluebird's nest are always sweet and clean, and the nestlings immaculate. The parent bird not only ceaselessly carries food to the young, but is often seen hurriedly leaving the nest with a small white package in bill, an action full of significance to every member of the family.

The excrement of the nestlings of Woodpeckers and Passerine birds is surrounded by a transparent sac of mucous, which is probably secreted at the lower end of the alimentary canal, and of such consistency as to allow of its being picked up without soiling bill or fingers, a condition which undoubtedly occurs to some extent in other orders of birds. The Bluebird carries these packages several rods from the nest, and presumably drops them. Many other birds probably dispose of them in this way, but it is not commonly known that others, among which I can now certify the Robin, Cedar Waxwing, and Red-eyed Vireo, devour the whole or a part of the excrement at the nest.

The Robin has undoubtedly been seen by many in the characteristic pose shown in one of the photographs standing on the brim of the nest, and usually with head inclined, as if dotting on her young and thinking what fine children they are, when this attitude is really one of sanitary inspection. Shortly after feeding, the nestling becomes very uneasy, raises itself to its full height or tries to do so, and when possible drops the excrement over the edge of the nest. The old bird follows every movement, snaps up the excrement the moment it leaves the body, and either swallows it immediately or carries it away. When seen flying from the nest with head slightly depressed and beak outstretched

the Robin is usually engaged in errands of this kind. In considering such actions I refer particularly to the three species mentioned, which I have watched repeatedly at a distance of two feet or less for hours at a time.

Young Robins are fed and cared for by both parents. I have seen the mother Robin remove the excrement from the nest, devour it, and a moment after take it directly from the young and carry it away. Again, on the following day the same bird, after swallowing all the available excrement, fell to brooding her young and remained in this position full twenty minutes by the watch without showing the least desire to reject anything which had been eaten. I have seen the female Cedarbird come to her nest of five half-fledged young, regurgitate black cherries, and after distributing them, inspect her household with the closest attention, picking up and swallowing every particle of excrement. This mother then spread her wings over her brood, and shielded them from a hot August sun for over an hour. Meantime the male came repeatedly, and passed cherries around. The female who stood erect, straddling the nest, would occasionally inspect her brood and devour the excrement. She would also snap at every passing insect, and I saw her catch a large red ant, which was quickly transferred to the mouth of a young bird. She would erect and lower her crest, stand with mouth agape for long intervals, but there was never a sign of ejecting what had been eaten.

After watching such behavior, which I have seen repeated with slight variations many times, I am convinced that the excrement is actually and definitively swallowed, and not merely taken into the gullet to be regurgitated later. The Cedar Waxwing, however, uses its distensible gullet as a temporary receptacle for food, and it is possible that in this species the excrement goes no farther than the œsophagus, from which it is later ejected. The actions of the bird just described, however, do not favor this idea.

Not only is the nest carefully cleaned, but Robins and Vireos energetically pick their young all over, a very important function, since the minute swarming particles which infest birds' nests, known as bird lice, often cause great discomfort, and especially to the young when weakly.

Cleanliness is an imperative instinct with such birds as the Kingfishers and Bank Swallows, whose nests are placed in the ground, while Barn and Eave Swallows, House Sparrows, and Pigeons represent a considerable number of other species which secure protection by placing their nests in remote, high, or inaccessible places. While their nests may be clean, the ground beneath them usually is not.

It is plainly advantageous for birds which breed on or near the ground to remove every particle of litter which would stain or whiten the leaves and surrounding foliage, and thus advertise the secret of their nest to enemies, even to those who prowl after dusk. When a Red-eyed Vireo, whose behavior I studied at close range, dropped any bit of excrement by accident, she darted after it with such speed that it was snatched up before reaching the ground, or before falling a distance of four feet. Not a trace of defilement is ever seen around the dwellings of any of these birds.

On the other hand, predaceous species like Hawks pay no attention to such matters. The excrement of their young is voided in a semi-fluid state and in a peculiar manner. With tail turned to the edge of the nest the bird shoots it off to a distance of two or three feet, and it may strike the ground six or seven feet from the nesting tree. The only significance which such actions have is that of keeping the nest clean. The advertisement of the nest stains on the leaves below is a matter of indifference to these bold and persistent outlaws, who have little to fear from any enemy save men.

Owls, who breed in holes in trees, are reported to have filthy nests, especially where the cavity has been in use for several successive years, but this seems to be due to the remains of their quarry and to the accumulation of rejected food-pellets rather than to the presence of excrement.

The haunts of certain sea fowl are often reeking with filth during the breeding season, and the guano beds of the South American coast mark the places of assembly and probably of the breeding of myriads of sea fowl for long periods of time. However, the birds themselves and their nests are generally clean, and any other condition in the case of most birds would soon become intolerable.



FIG. 1. ROBIN ABOUT TO CLEAN NEST

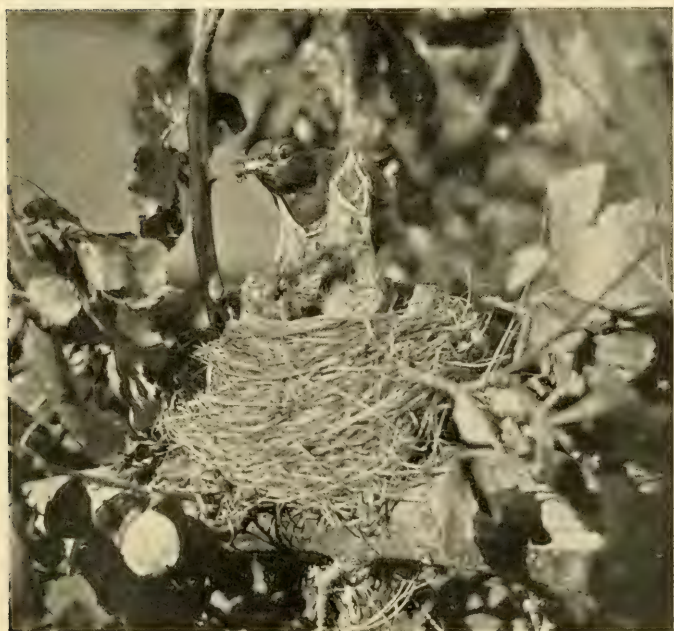


FIG. 2. ROBIN CLEANING NEST.



FIG. 1. BLUEBIRD CLEANING NEST



FIG. 2. BLUEBIRD CLEANING NEST

The cleaning of the nest and young is apparently instinctive with the adult bird, and so is also the care with which many avoid soiling the ground and foliage about their nesting sites. They apparently have no choice in these matters, but act because they must. As to eating the excrement, however, it is not so clear. We need many more observations on different individuals before a decision can be reached. If it should be proved that in the Robin, for instance, some individuals never eat the excrement while others do, as we know, we might regard the action as an acquired habit. When the pellicle breaks in the mouth, an accident which I have seen happen in the case of a Robin, the bird must swallow some part in order to get rid of it. Moreover, since digestion in the young is an imperfect process, the substance may serve as a kind of predigested or partially digested food, which might be acceptable to the old birds in times of stress, as in prolonged and heavy storms when food is not easy to procure.

The fact that the Robin removes a part of the excrement from the nest but devours the remainder would seem to imply either that it discriminates what is suited for food, which is improbable, or that this action is a habit not yet fully established, and certainly not ingrained.

DESCRIPTIONS OF PHOTOGRAPHS.

Plate II, Fig. 1. Female Robin inspecting nest. Fig. 2. Male Robin cleaning nest. (In act of swallowing excrement removed from nest; the adherent dead grass is from nest lining.)

Plate III, Fig. 1. Female Bluebird carrying food to young. Fig. 2. Female Bluebird leaving nest hole in act of cleaning nest. (Photographed at a distance of 18 inches.)

NOTES ON SOME OF THE BIRDS OF BRITISH COLUMBIA.

BY ALLAN BROOKS.

1. *Stercorarius longicaudus*. LONG-TAILED JAEGER.—A rare though regular fall migrant to the lower Fraser Valley. I have only observed it during the month of October. One white-breasted adult taken at Sumas Lake.

2. *Gavia alba*. IVORY GULL.—A fine adult was taken at Penticton on the southern extremity of Okanagan Lake during the month of October, 1897, by Mr. J. T. Studley. No cold or stormy weather had occurred to account for the occurrence of this Arctic Gull so far from its habitat.

3. *Xema sabinii*. SABINE'S GULL.—I shot a young specimen on the north end of Okanagan Lake Sept. 9, 1897. I had noticed it for two days, hawking for insects close to the surface of the water in company with large numbers of Night Hawks.

4. *Sterna paradisæa*. ARCTIC TERN.

5. *Hydrochelidon nigra surinamensis*. BLACK TERN.—These are the only species of Tern I have taken in this Province, the former only on Okanagan Lake in October, the latter at several points on both sides of the Cascade Mountains. It breeds in Chilcotin.

6. *Anas discors*. BLUE-WINGED TEAL.

7. *Anas cyanoptera*. CINNAMON TEAL.—Both of these used to breed in numbers in the vicinity of Chilliwack and Sumas, on the lower Fraser, but they are now scarce, owing to the prevalent floods in June which flood out their nests.

8. *Glaucionetta islandica*. BARROWS'S GOLDEN-EYE.—An abundant summer resident in the interior of British Columbia.

9. *Micropalama himantopus*. STILT SANDPIPER.—I shot two Sept. 19 at Sumas Lake, the only ones I have ever seen. They were in the first plumage.

10. *Tringa bairdii*. BAIRD'S SANDPIPER.—Except *T. minutilla*, the most abundant *Tringa* in British Columbia.

11. *Ereunetes pusillus*. SEMIPALMATED SANDPIPER.—Very abundant east of the Cascades and a regular migrant down the lower Fraser and the coast, arriving as a rule about two weeks ahead of *E. occidentalis* in the fall migration.

12. *Accipiter atricapillus*. AMERICAN GOSHAWK.

13. *Accipiter a. striatulus*. WESTERN GOSHAWK.—I have taken both forms both east and west of the Cascades. The latter seems to be the only form that breeds in southern British Columbia where I have noticed

it in summer as far east as Arrow Lake. The two subspecies intergrade perfectly.

14. *Buteo lineatus elegans*. RED-BELLIED BUZZARD. — Only noticed west of Cascades. Rare.

15. *Buteo swainsoni*. SWAINSON'S BUZZARD. — The darkest form of this Buzzard is a common breeder on all the mountains at high elevations, being only found in open or park like country. The only pair of white-breasted birds I ever saw in the Province was breeding on a low mountain near Vernon.

16. *Falco rusticolus*. GYRFALCON. — A regular winter visitant west of the Cascades. Young birds are sometimes almost dark enough for *obscurus*, and adults light enough for the Iceland form. The flight of this Falcon is as a rule rather slow compared with that of other large Falcons, but when in full pursuit of a Duck it gets up a tremendous velocity and can turn and twist almost as quickly as a Goshawk. In ordinary flight the wing stroke is much shorter than a Peregrine's, and the bird when going straight away appears to be hovering like a Kestrel.

17. *Falco mexicanus*. PRAIRIE FALCON. — This species used to be a regular migrant to lower Fraser Valley, but I have not seen or taken one for three years, nor have I ever seen one east of the Cascades.

18. *Falco peregrinus anatum*. PEREGRINE FALCON. — This is the only form I have taken, though *pealei* undoubtedly occurs on the coast. The form breeding on lakes in the interior seems to approach closely the small form that breeds on the Mediterranean (*brookei* Sharp).

19. *Falco columbarius*. PIGEON HAWK.

20. *Falco c. suckleyi*. BLACK MERLIN. — Both of these forms of Merlin occur both east and west of Cascades, but I have never seen a specimen that could not be referred without hesitation to one form or the other.

21. *Falco richardsonii*. RICHARDSON'S MERLIN. — Occurs in migrations only, both east and west of the Cascades.

22. *Falco sparverius*. AMERICAN SPARROW HAWK. — Mr. Brewster identifies specimens from this Province with the form *deserticola* (Mearns). It is a permanent resident throughout the southern portion of the Province.

23. *Syrnium occidentale*. WESTERN BARRED OWL. — Apparently confined to the lower Fraser Valley, where it is a rare and local resident.

24. *Nyctala richardsoni*. RICHARDSON'S OWL. — A considerable irruption of this Owl occurred throughout the southern interior during the winter of 1898-99.

25. *Bubo virginianus*. GREAT HORNED OWL. — The typical form occurs, as well as every possible intergrade between the darkest *saturatus* and *subarcticus*, almost light enough for *arcticus*.

26. *Speotyto cunicularia hypogæa*. BURROWING OWL. — I have three records west of the Cascades. East of them it is a tolerably common breeder in the semi-arid interior.

27. *Glaucidium gnoma californicum*. CALIFORNIA PYGMY OWL. — Mr. Brewster informs me that all the British Columbian specimens which I have sent him are referable to this subspecies.

28. *Coccyzus americanus occidentalis*. CALIFORNIA CUCKOO. — Becoming more abundant in the coast region every year, probably on account of the invasions of the forest tent caterpillar.

29. *Dryobates villosus leucomelas*. NORTHERN HAIRY WOODPECKER. — I have taken the northern form of the Hairy Woodpecker several times in the lower Fraser Valley west of the Cascades.

30. *Picoides americanus alascensis*. ALASKAN THREE-TOED WOODPECKER. — Resident on the Cascades as far south as Mt. Baker.

31. *Picoides arcticus*. BLACK-BACKED THREE-TOED WOODPECKER. — The only form of Three-toed Woodpecker I have observed east of the Cascades.

32. *Chordeiles virginianus*. NIGHTHAWK. — Mr. Ridgway identified specimens I sent him from west of the Cascades as the typical form. I doubt whether *henryi* occurs in British Columbia.

33. *Phalænoptilus nuttalli*. POOR-WILL. — A tolerably common summer resident throughout the southern portions of the semi-arid interior.

34. *Cypseloides niger*. BLACK SWIFT. — Very abundant; breeds at high altitudes.

35. *Otocoris leucolæma*. PALLID HORNED LARK. — A common migrant at Chilliwack (west of Cascades) where I have also taken both the other Horned Larks found in the Province — *merrilli* and *strigata*.

36. *Cyanocitta stelleri annectens*. BLACK-HEADED JAY. — I have a typical example of this form taken within 40 miles of the coast.

37. *Dolichonyx oryzivora albinucha*. WESTERN BOBOLINK. — Occasional both east and west of the Cascades and many breed.

38. *Molothrus ater*. COWBIRD. — Tolerably common east of and a straggler west of the Cascade Mountains.

39. *Xanthocephalus xanthocephalus*. YELLOW-HEADED BLACKBIRD. — I have two records of this species for Chilliwack.

40. *Agelaius phæniceus*. REDWING. — Redwings from southern British Columbia are characterized by very long slender bills, and a very rufous coloration in the female: Mr. Brewster informs me they come closest to *sonoriensis*.

41. *Icterus bullocki*. BULLOCK'S ORIOLE. — Abundant east of the Cascades, and a few pairs breed west of them at Chilliwack.

42. *Loxia leucoptera*. WHITE-WINGED CROSSBILL. — Chilliwack — 3 specimens.

43. *Leucosticte tephrocotis*. GRAY-CROWNED LEUCOSTICTE. — I have taken the typical species as far west as Chilliwack.

44. *Leucosticte tephrocotis littoralis*. HEPBURN'S LEUCOSTICTE. — Breeds above timber line in the Cascades.

45. *Spinus tristis salicamans*. WESTERN GOLDFINCH. — Of irregular occurrence during early winter at Okanagan.

46. *Rhynchophanes mccowni*. McCOWN'S LONGSPUR.—I shot an adult male at Chilliwack on June 1, 1887, and two years later took two females on the same spot.

47. *Ammodramus savannarum perpallidus*. WESTERN GRASSHOPPER SPARROW.—A summer resident near Vernon.

48. *Chondestes grammacus strigatus*. WESTERN LARK SPARROW.—A very scarce summer visitant, both east and west of the Cascades.

49. *Zonotrichia querula*. HARRIS'S SPARROW.—I took two at Sumas (Lower Fraser) 10th January, 1895.

50. *Junco hyemalis*. SLATE-COLORED JUNCO.—I have twice observed and once taken the Eastern Junco at Chilliwack, B. C.

51. *Lanius ludovicianus gambeli*. CALIFORNIA SHRIKE.—My father took one at Chilliwack, April, 1888.

52. *Vireo olivaceus*. RED-EYED VIREO.—The most abundant Vireo both east and west of the Cascades in southern British Columbia.

53. *Helminthophila rubricapilla gutturalis*. CALAVERAS WARBLER.—Common in the Okanagan district.

54. *Icteria virens longicauda*. LONG-TAILED CHAT.—Sumas, 26th May, 1897.

55. *Setophaga ruticilla*. AMERICAN REDSTART.—Regularly east of, and accidentally west of Cascades.

56. *Salpinctes obsoletus*. ROCK WREN.—I have taken only one west of the Cascades (Chilliwack, Nov., 1889). Common in suitable localities in southern interior.

57. *Sitta aculeata*. SLENDER-BILLED NUTHATCH.

58. *Sitta pygmæa*. PYGMY NUTHATCH.—Confined to the region of *Pinus ponderosa*.

59. *Parus hudsonicus columbianus*. COLUMBIAN CHICKADEE.—Common at high elevations in the interior. I have taken it as far west as Nicola. In the mountains west of Arrow Lake I observed all four species of Chickadees associated together — *columbianus*, *rufescens*, *gambeli*, and *septentrionalis*.

60. *Psaltiriparus minimus*. LEAST TITMOUSE.—I shot two specimens out of a considerable number on 25th Nov., 1899, but could not find any the next day at same place, nor have I ever seen them before, though I always have looked out for them.

61. *Merula migratoria*. ROBIN.—I have taken the typical form as far west as Chilliwack, although *propinqua* is the resident race.

ARGUMENTS AGAINST THE BANNER MARK
THEORY.

BY ABBOTT H. THAYER.

THE following paper is an attempt to show that the Directive Coloration theory is largely a mistake, and that so-called 'banner marks' belong to the greater class of protection patterns and protective colorations. And, secondly, that in many cases they do not serve even in a minor degree as 'banner marks.'

Of course, to any one who feels the inevitability of Natural Selection, it is obvious that each organ or structural detail, and likewise each quality of organic forms, *owes its existence to the sum of all its uses*, so that while it is sustained at a certain stage of development mainly by the value of its principal function, this is only to the degree to which it can perform this without hostility to the other requirements of the organism, each one of the latter modifying it in proportion to its own importance. So that when one says an animal's markings are for this purpose or for that, he speaks inaccurately. Whenever we can know the relative importance of mutual recognition as compared to concealment, and then how much markings help recognition, and how much they help concealment, we shall be in the right track, though still ignoring many factors.

The so-called 'banner marks,' or, as Mr. Thompson has termed them, "*directive coloration marks*" of birds and mammals,¹ have never seemed to me satisfactorily explained by the theory that they exist mainly to aid other animals, both of the same species and of others, both friendly and hostile, to recognize the bearer of the 'banner marks.' Such means seem to me far too crude to play a prominent part in aiding the recognition powers of a class of beings who do so obviously inter-communicate, in many cases by means infinitely more subtle and much more akin to such instinctive methods as guide even the Indian and to some extent the white hunter in the chase. These men could not possibly

¹ Auk, Vol. XIV. pp. 395, 396, pl. iv.

impart or explain the more instinctive half of their wood craft, any more than a man can tell you how he recognizes his wife or child a mile off. It is not necessarily by any detail that he does so, but by the effect of all the combined attributes of the distant figure. It is, as it were, by the chord struck in his brain by the sum of the personal notes revealed in the pose and action of the figure.

When one reflects that even a human being, if he be a student of birds or quadrupeds, can grow to know a great many species so well as to recognize them when they are mere specks in the distance, precisely because each one's every motion in flight or running is such as only that particular species could make, is it not absurd to doubt that creatures infinitely more dependent on such recognition must have developed a corresponding power, and out of all comparison beyond a man's, and consequently have, as to recognition purposes, too little use for the small aid of these markings to keep them in their present high state of development? And while the accepted explanation of these markings seems so feeble, there is another so ample, that, to me at least, it takes possession of the field at a bound. It is Dr. C. Hart Merriam's. His theory is that top and rear markings coöperate with protective gradation in a most striking way for the preservation of the wearer when pursued. Since these bright patterns, such as the white stern and uplifted tail of deer or rabbit, or the white wing-and-tail-bars of many birds, establish, of course, a strong image on the pursuer's retina, so that when, too closely pressed, the quarry, changes tactics, and taking to cover, *closes suddenly his 'banner marks'* (which deer and hares do by dropping their tails and birds by folding wings and tail), he vanishes like magic from his enemy, who is left for just an essential moment staring wildly about to recover the sight of the bright pattern he was chasing, while its possessor is slipping off to still safer cover, enveloped in a cloud of invisibility more than doubled in power by its contrast to the previous conspicuousness. This seems true of deer, hares, and in fact of most creatures that are the *regular prey of others*. Bay-winged Buntings, Robins, Mockingbirds, Rose-breasted Grosbeaks, Towhees, Redstarts, and most War-

blers, Shrikes, Meadowlarks and Nuthatches, are a few American examples of birds which show in flight more or less additional white or bright pattern on their upper sides, which disappears when they close tail and wings. Of course the irregular motion of flight or running brings also into the light the borders of their white underside (which, contrary to Mr. Thompson, is an essential part of their protective coloration when at rest, unless they are squatting), making it aid, for the moment, their conspicuousness.

Now, as to the patterns on the *under* side of wings of soaring birds, and of such species as Plover, which hold their wings stretched upward after alighting; the theory that they are first of all for mutual recognition seems disproved by the foregoing arguments, and we should seek other explanations of their existence in cases where, as I have pointed out, any good observer can recognize the species by its whole 'cut' at a far greater height than one could see the pattern, and if this be true of even human observers, how *can* birds need them for the recognition of each other? Also, as to Plover, it does not seem probable that after being visible and recognizable in flight they should so elaborately raise their wings after alighting for no other reason than the small added recognition-aid they thereby give to their neighbors, especially since their under wing pattern is of course invisible to this neighbor (unless Plovers' eyes be something quite beyond our imagination) until they are so near each other that mutual recognition is inevitable without aid of badges. All these under-wing patterns, without any exception that I can recall, belong to birds that live among backgrounds of similar patterns. They are found on birds that live more or less amidst vegetation, which is the same as saying *where their background abounds in the nearly parallel lines of grass, reed, or tree stems.* They are most lacking on ocean birds which have no such background, passing their lives between bare ocean and bare cliffs. These patterns, crossing the main form as they do, belong in appearance to the great class of cross-markings, which in the tiger and many smaller cats, in the zebra, and in many snakes, as well as on many female birds, especially of the Gallinæ, such as the Capercaillie, Blackcock and Prairie-Hen and countless other members of the animal kingdom, unmistakably coöperate

with protective gradation to carry the aspect of the vertical stems, etc., right across the animal, so as to help him disappear.

To sum up: The pattern on the wings of Hawks and Owls, the world over, varies to a surprisingly small degree, which could not be the case if its main object were the distinguishing of the species from each other. Surely no one imagines that it has developed to help show to the rest of the animal kingdom that its wearer is not a Duck, and it shows no propensity to try to distinguish such nearly allied forms as could need it. For instance, even human beings know at a glance the long sharp wing of a Falcon from the broad round one of an Accipiter, long before they are near enough to see the pattern, yet the different species within each of these genera have almost identical under wing patterns. The tail of the American Sparrow Hawk, especially that of the male, is certainly an exception.

Unquestionably Grouse, etc., know an Accipiter from a Buteo without looking for what Mr. Thompson called, by a slip of the mind, the "wrist-mark," and still more obviously must this be the case between the Hawks themselves, for whose benefit alone this pattern could exist, if recognition were its object. In short, if these markings were mainly for identification of one Cooper's Hawk to another, they would avoid the Sharpshin's pattern, while if they were meant to announce the wearer to a Grouse they would hurt his hunting-chances, and we should see, in the Accipiter's wing, signs of imitating the pattern of some harmless Hawk. In other words the advocate of the "banner mark" theory in the case of the under pattern of Hawks' and Owls' wings must face the fact that these birds live mainly in woods or smaller vegetation, and wear, even on the *underside of their wings*, the very patterns nature furnishes to a vast number of vegetation-dwellers, both of birds and mammals; while these patterns are nowhere, or as good as nowhere, found on any species that live wholly away from vegetation. Then, if he still believes that what difference there is, is for recognition, well and good; only, were recognition the *main* use, why do even their under wings retain the twig pattern which tends to *efface* the wing by its resemblance to the twigs and parallel distant tree-trunks, which in the woods form its background, and thus make it harder to distinguish,

while a plain black or white wing, or one with any kind of strong pattern on an empty ground, would serve to distinguish it far better, in the woods? On the other hand, while Gulls have pretty good "banner marks" on their primaries, they miss a great opportunity for immensely greater self-differentiation in powerful under-wing patterns, and if my theory be correct, this they are *prevented from having by the greater importance of coalition in appearance with their blank ocean and cloud back-grounds.*

In short, both the barred wings of wood-dwelling Raptores and the unmarked wings of ocean birds confirm the impression that nature finds it worth while to paint on most animals an imitation of their normal background, even when, as in the case of the under sides of wings, and where such under-sides are habitually exposed to view, there would seem to be small use in it, and her finding this worth while, suggests that we have still much to learn about their home habits.

It is also significant that among our native Raptores, for instance, the three species that wear on their under wings the least amount of cross-barring are those that spend the most of their time *out of the woods* in fields and marshes. They are the Marsh Hawk, Rough-leg and Short-eared Owl.

The deep-wood-dwelling Long-ear has the Short-ear's wing *with some forest pattern added.* Mr. Thompson in his plate of under patterns has wholly omitted the Goshawk's cross-bars, which are like those of the two smaller Accipiters, only fainter. He has also given the Red-shoulder much too strong under-tail bars. Otherwise his diagrams are pretty just, only they give an impression that these patterns are far more visible at a distance than is the case.

I am far from denying that every visible distinction *helps* recognition (though I believe that the uses of the recognition are still very hazily conceived), and have mainly attempted to show what *other* forces are at work upon animals' colors. Unmistakably, nature regards *concealment*, both of the hunter and hunted, as of paramount importance.

One other point: Granting that these under wing barrings make, mainly by their different degrees of local darkness, etc. different patterns, at a distance, at least in different genera,

would it not be still stranger if they did not, or if different, species, with their different habits, were still more alike? Surely this difference of pattern does not clamor for explanation.

Still another argument to show that *protection* is, somehow, the main object of the cross-bars lies in the fact that young birds in many cases are more barred than the adults of the same species just as nature keeps the young of many *ungraded* species graded for protection like their mother.

DESCRIPTIONS OF THREE NEW BIRDS FROM ALASKA.

BY LOUIS B. BISHOP, M.D.

IN STUDYING the collection of birds secured in Alaska during the summer of 1899 by the party from the Biological Survey, of which I was a member, thanks to the kind invitation of Dr. Merriam, Chief of the Survey, I have found that three Alaskan birds differ sufficiently from the same species from other parts of the country to deserve description as subspecies, and that two subspecies already described — *Parus hudsonicus evura* Coues and *Hylocichla ustulata almæ* Oberholser — in the light of more material seem to merit recognition.

Parus hudsonicus from Alaska is certainly subspecifically distinct from *P. hudsonicus* from New Brunswick, and so far as I have been able to study them *hudsonicus* from Ungava, Labrador, and New Brunswick appear the same, but as I have not seen birds from the type locality of *hudsonicus*, or from Ungava in nestling and early fall plumage, I can only hope to throw a little light on the races of this puzzling species.

To the gentlemen in charge of the collections of the Biological Survey, the U. S. National Museum, the American Museum of Natural History, and the private collection of Mr. Brewster, I wish to express my thanks for the privilege of studying large series of these species and for much assistance received, and to Mr. Outram Bangs, Dr. Jonathan Dwight, Jr., and Mr. Homer L. Bigelow for kindly loaning me specimens for comparison.

Canachites canadensis osgoodi, subsp. nov. ALASKA GROUSE.

Type, No. 4310, Coll. of L. B. Bishop, ♀ ad., Lake Marsh, Northwest Territory, July 5, 1899; (W. H. Osgood) L. B. Bishop.

Subspecific characters.—Similar to *Canachites canadensis* but with the ochraceous buff bars replaced everywhere by cream-buff and grayish white. On the upper parts the gray tips are paler, the ochraceous buff replaced by cream-buff and whitish, and the pale bars of the cervix grayish white instead of buff; below the white tips are larger, the pale bars whitish and cream color instead of buff, becoming cream-buff only on the jugulum.

Distribution.—Northwest Territory, Northern British Columbia and Alaska north of the coast mountains.

Measurements of type.—Length, 15.50; extent, 24.25; wing, 7.20; tail, 4.54; tarsus, 1.32 inches. Average length of 4 ♀, 15.38 inches. Average of 6 ♀ and 1 ♂ in wing, 7.02; tail, 4.51; tarsus, 1.34 inches.

Description.—Above irregularly barred with grayish white and black, the pale bars becoming cream-buff on crown and interscapulars and grayish buff on wing-coverts and concealed bars of rump and upper tail-coverts; scapulars and inner tertiaries black, irregularly barred on outer web and tipped with cream-buff and gray with central wedge of white. Quills dusky, mottled on outer web and obscurely tipped with whitish; tail dusky, vermiculated, chiefly on outer web, with grayish buff and tipped with tawny ochraceous. Below barred with grayish white and black, the feathers especially on breast and abdomen broadly tipped with white; the pale bars becoming cream-color on throat and toward base of feathers on sides of breast, and distinctly cream-buff only on jugulum; flanks vermiculated with black, grayish white and pale cream-buff with broad central wedge of white. Tarsal feathering pale mars brown obscurely spotted with darker.

Remarks.—In worn breeding plumage adult females of *osgoodi* differ from *canadensis* from Maine as described above. After completing the summer moult and in early spring females from Alaska differ from females from Ontario and Quebec in the same manner but to a less degree, having the buff everywhere, especially on the cervix and abdomen, paler and the white tips below broader.

A summer male of *osgoodi* from Thirty Mile River differs from summer males of *canadensis* and *labradorius* only in having the tail tipped with paler rufous.

Two adult females of *labradorius*¹ from Mr. Bangs's collection

Mr. Bangs writes me that these are not the best examples of *labradorius*, but are the most characteristic at present available.

are far closer to *canadensis* than to *osgoodi*. *Osgoodi* in spring has the buff of the entire plumage much paler, and the gray tips of the upper parts, especially the rump and tail-coverts, paler gray, and not the bluish gray of *labradorius*. In worn breeding plumage the difference between the two forms is far more striking, *osgoodi* having the white tips below broader, the buff markings far paler throughout, and replacing the buff bars of the abdomen, cervix and rump with grayish white.

In natal plumage *osgoodi* is paler than *canadensis*, especially on wings, upper wing-coverts, scapulars and crown-patch, and has the tips of the greater coverts and central streak of tertiaries and scapulars white instead of buffy. Maxilla brownish black; mandible and tip of maxilla whitish; soles and tarsi behind maize yellow; scutellæ of tarsi and toes isabella color; nails brown.

In juvenal plumage *osgoodi* is paler throughout than *canadensis*, replacing the rusty everywhere by cream-buff, and the buff throat with whitish.

I have named this form in honor of Mr. W. H. Osgood of the Biological Survey, who secured almost all the specimens of this Grouse taken on our trip.

Sayornis saya yukonensis, subsp. nov. YUKON PHOEBE.

Type, No. 165223, U. S. Nat. Mus., Biol. Survey Coll., ♂ ad., Glacier, White Pass, Alaska, June 8, 1899; W. H. Osgood.

Distribution.—Yukon Valley in summer; Texas in winter.

Subspecific characters.—Similar to *Sayornis saya* but darker, the gray of the upper parts clearer—less scorched, with the pale edgings of the wing-coverts and secondaries narrower; the tail longer; the bill shorter and relatively broader.

Dimensions of type.—Wing, 4.30; tail, 3.58; culmen, .78; bill from nostril, .42; width of bill at base, .33 inches.

Description.—Above dark smoke-gray, darker on head. Lores, orbital ring, ear-coverts, wings and upper tail-coverts dusky, the last darkest. Tail black. Secondaries and tertiaries bordered externally and tipped with whitish; primaries faintly tipped with the same; two whitish bands on coverts across wings. Chest smoke-gray, becoming pale ashy on throat and drab gray on flanks. Abdomen and under tail-coverts pale cinnamon. Under wing-coverts cream-buff, axillars darker buff.

Measurements of fifteen specimens.—Wing, 3.82–4.30 (average 3.99); tail, 3.22–3.58 (average 3.39); culmen, .73–.80 (average .76); bill from

nostril, .38-46 (average .41); width of bill at base, .28-33 (average .31) inches.

Measurements of fifteen specimens of Sayornis saya.—Wing, 3.67-4.27 (average 4.08); tail, 3.03-3.59 (average 3.27); culmen, .75-.83 (average .80); bill from nostril .42-48 (average .45); width of bill at base .27-.34 (average .30) inches.

Remarks.—*Sayornis saya* (Bonap.) is separable into two well-marked races, as described above: *saya*, a paler, rather scorched appearing bird with shorter tail and longer bill, living in California, Lower California, Nevada, Utah, Arizona, Colorado, New Mexico, Mexico and north to Fort Laramie, Wyoming, from all of which localities specimens in the above measured series have been selected; and *yukonensis*, a darker, clearer gray bird, with longer tail and shorter bill, of which besides our Yukon series of eleven specimens, only two of them adults, and winter birds from Texas, I have only seen one typical bird, which was taken at Fort Klamath, Oregon, September 20, 1882, by Captain Bendire. A specimen in Mr. Brewster's collection taken at Haywards, California, February 23, one from Laredo, Texas, January, and a young from Big Bend of the Musselshell River, Montana, August 25, in the U. S. Nat. Mus., are intermediate. Specimen of *saya* from Lower California and Arizona are the palest, those from Colorado—the type locality—the most scorched.

Yukonensis in juvenal plumage differs from *saya* in that plumage even more than do the adults; the rusty suffusion of the upper parts, particularly pronounced on the lower back and rump of the latter, being hardly perceptible in the former, and the throat and chest of *yukonensis* being much darker.

Contopus richardsonii saturatus, subsp. nov. ALASKAN
WOOD PEWEE.

Type, No. 4142, Coll. of Louis B. Bishop, ♂ ad., Haines, Alaska, June 2, 1899; L. B. Bishop.

Subspecific characters.—Similar to *Contopus richardsonii* but darker and more olivaceous above, pale margins of secondaries, tertiaries and greater coverts narrower and less white; gray of breast and sides darker and broader; bill shorter and narrower with mandible darker; tarsus longer.

Distribution.—Yukon Valley, southern Alaska and British Columbia near the coast in summer, migrating south through California.

Measurements of type.—Length, 6.69; extent, 11; wing, 3.52; tail, 2.92; exposed culmen, .49; bill from nostril, .38; width of bill at base, .30; tarsus, .62 inches.

Description.—Above clove-brown darker on head; wings and tail brownish black, the secondaries faintly margined externally, the tertiaries more broadly, with whitish; greater and middle wing-coverts tipped with brownish white forming two bars across wings; indistinct orbital ring and loreal spot of whitish. Below, including axillars and lower wing-coverts, dull grayish brown becoming darker and more olivaceous on sides of breast and flanks; throat and lower tail-coverts whitish, the feathers becoming grayish-brown centrally; central abdomen yellowish white. Mandible brown, paler toward base.

Measurements of ten specimens.—Wing, 3.19–3.50 (average 3.34); tail, 2.54–2.92 (average 2.66); exposed culmen, .43–.49 (average .46); bill from nostril, .33–.40 (average .37); width of bill at base, .30–.34 (average .32); tarsus, .52–.62 (average .56) inches.

*Measurements of twelve specimens of *Contopus richardsonii* from California, Arizona, Texas and South Dakota.*—Wing, 3.14–3.61 (average 3.40); tail, 2.41–2.88 (average 2.66); exposed culmen, .45–.52 (average .49); bill from nostril, .38–.43 (average .40); width of bill at base, .33–.38 (average .35); tarsus, .48–.55 (average .52) inches.

Remarks.—*Contopus richardsonii* (Swains.), described from a single bird taken at Cumberland House, June 27, is divisible into three well-marked geographical races,—*richardsonii*, inhabiting most of western North America; *peninsulae*, paler with larger bill, confined to Lower California; and *saturatus*, darker with smaller bill, confined to Alaska and the coast of British Columbia in the summer.

A second specimen of *saturatus* from Haines has the throat as well as the abdomen yellowish. Summer birds from the Yukon Valley and Ducks, Brit. Col.—the latter in the collection of the Am. Mus. Nat. Hist.—are browner, less olivaceous, above than the type, and the Yukon birds have shorter wings and tails, but all are darker than *richardsonii*, and have the small bill, brownish mandible, and longer tarsus of *saturatus*. Males taken at New Westminster, Brit. Col., May 31, and Fort Verde, Arizona, May 10, now in the Am. Mus. Nat. Hist., and another taken at Riverside, Cal., May 11, now in the collection of Mr. William Brewster, closely resemble the type; the latter two are doubtless migrants. Breeding birds in the collection of Mr. Brewster from Chilliwack, B. C., Fort Klamath, Ore., and Nicasio, Cal., are intermediate.

The only specimen of *richardsoni* from anywhere near the type locality that I have seen is a migrating female taken in Towner Co., N. Dak., June 4, 1895, by Mr. Homer L. Bigelow of Boston, and now in his collection. This bird has the mandible yellow, and is fully as pale as *richardsonii* from Arizona, but has a bill as small as the extreme of *saturatus*.

Measurements of this bird are:—Wing, 3.43; tail, 2.73; exposed culmen, .42; bill from nostril, .34; width of bill at base, .30; tarsus, .53 inches.

***Parus hudsonicus evura* Coues. YUKON CHICKADEE.**

This subspecies was separated by Dr. Coues in the second edition of his 'Key' on the basis of Alaskan specimens of *hudsonicus* being larger than those from the East. This difference, though existing and most marked in the size of the bill, is very slight. But there are marked differences in the plumage of the young and of adults in late summer that require the recognition of the two forms.

In worn breeding plumage Yukon birds closely resemble those from eastern North America, varying greatly individually in the coloring of the forehead and orbital region, but average slightly deeper black on the throat.

After the summer moult *hudsonicus* from the East goes into a plumage similar to that worn in winter and spring; *evura*, on the contrary, becomes of a color between dark hair-brown and drab on the crown and nape, entirely wanting the rusty of *hudsonicus*, and has less buffy on the back.

Winter birds from the Yukon, also Fort Rae and Fort Simpson, have reached a plumage having the rusty hair-brown head and back of winter *hudsonicus* from Ungava, Labrador, but average slightly *paler* above especially on the head. I fail to see any difference in the shade of the black throat, the chestnut of the sides, gray of side-neck or white of side-head. A single specimen taken at Fort Yukon, September 10, now in the U. S. Nat. Mus. Coll., is indistinguishable from winter birds from the same region, and the type of *P. h. stoneyi* differs only in having paler flanks. A bird taken at Fort Kenai, Alaska, May 10, closely resembles spring *hudsonicus* from the East — Ungava, New Brunswick, etc.

Evura in juvenal plumage differs from *hudsonicus* in the same manner as do fall adults but to a greater degree, having the crown and nape far darker and more drab, the throat much clearer black, far less rusty on the back and breast, and the wings and tail slate-black, with little of the brownish of *hudsonicus* from New York and Quebec. *Evura* in first winter plumage — represented by a specimen taken at St. Michaels September 20, 1899, — has a somewhat paler head than an August adult in fall plumage; but a darker head, blacker throat and less rusty back than young *hudsonicus* — Ungava to New Brunswick — in similar plumage.

***Hylocichla ustulatus almæ* Oberholser. ALMA'S THRUSH.**

This subspecies, separated by Mr. Oberholser (Auk, Vol. XV, p. 304), with a type taken in the East Humboldt Mts., Nevada, June 24, proves to be the common Thrush of the Yukon Basin and distinctly separable from *swainsonii*. Yukon birds are grayer above and average paler below and grayer on the sides than the type of *almæ*, and differ greatly in these respects from *swainsonii*, but the type of *almæ* is nearer the Yukon bird than to *swainsonii*, and is grayer than one taken at Lake Marsh, July 5. Our Yukon specimens are more worn than the type of *almæ*, though taken at about the same date.

An adult in winter plumage taken at Circle City, August 20, has the dark markings of throat and breast blacker than in *swainsonii*, the buff of cheeks paler and the upper parts, including wings and tail, darker and more olive.

In juvenal plumage *almæ* differs from *swainsonii* from New Hampshire far more than do the adults. In *almæ* the upper parts, wings and tail are between olive and olive-green — almost the same shade as *alicie* in first winter plumage — becoming raw umber on outer edges of quills and wing-coverts, and the central markings of the feathers of crown and scapulars are pale cream-color; far different from the raw umber upper parts with tawny olive edgings of quills and coverts, and bright buff central streaks of feathers on head and back of *swainsonii*. The orbital ring and suffusion of auriculars are cream-color in *almæ*, only the loreal stripe approaching the buff of *swainsonii*; the chest and throat are cream-color instead of buff, the dark markings blacker, the

flanks grayer. In fact *almæ* in this plumage differs from *alicie* in same plumage taken on the same day only in possessing the loreal stripe and orbital ring, having the ground color of the throat, chest and auriculars less white, and the edgings of the quills and wing-coverts slightly paler.

In first winter plumage the same difference obtains, *almæ* being distinguishable from *alicie* only by the slightly brighter edgings of the quills and wing-coverts, and the orbital ring, loreal stripe, and auricular suffusion of cream-buff; and differs greatly from the raw umber upper parts, wings and tail, and bright buff loreal stripe, orbital ring and suffusion of breast, throat and auriculars of *swainsonii*. The dark markings of the breast and the flanks are also darker than in *swainsonii*.

DESCRIPTION OF A NEW SUBSPECIES OF *MELEAGRIS GALLOPAVO* AND PROPOSED CHANGES
IN THE NOMENCLATURE OF CERTAIN
NORTH AMERICAN BIRDS.

BY E. W. NELSON.

WHILE working on the Mexican birds in the Biological Survey collection, the necessity of certain changes in the nomenclature of several North American species has become evident. These changes refer to *Meleagris gallopavo*, *Colaptes cafer*, *Sayornis nigricans*, *Myiozetetes texensis*, and *Agelaius phoeniceus longirostris*. The most interesting development of our recent work is the demonstration of the difference between the Wild Turkeys of Arizona and those of the Sierra Madre of western Mexico as detailed below.

All measurements are given in millimeters.

Meleagris gallopavo merriami, subsp. nov. MERRIAM'S
TURKEY.

Type, No. 165898, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Collected 47 miles southwest of Winslow, Arizona, Jan. 9, 1900, by E. A. Goldman.

Distribution.—Mountains of Arizona, western New Mexico, and south to the Mexican border and north probably into extreme southwestern Colorado.

Subspecific characters.—Distinguished from *M. g. fera* by the whitish tips to feathers of lower rump, tail-coverts and tail; from *M. g. mexicana* by its velvety black rump and the greater amount of rusty rufous succeeding the white tips on tail-coverts and tail, and the distinct black and chestnut barring of middle tail feathers.

Description of adult male in winter.—Neck all around, under side of body to lower abdomen, upper back, scapulars, middle and lesser wing-coverts varying in different lights from rich metallic purplish green to fiery red bronze; feathers of lower back and rump rich velvety black with scarcely any trace of iridescence but tipped with pale rusty white on lower rump; upper tail-coverts broadly tipped with rusty white and with a subterminal band of dark rufous succeeded by a broader band of brilliant iridescent greenish purple, the bases of the feathers narrowly barred black and rufous; the long, outermost upper tail-coverts usually with a broad subterminal rufous band succeeded basally by narrow black and rufous bars; tail including middle feathers tipped with rusty white, with subterminal band of rufous followed by a broad black band and thence to base narrowly barred with black and dark rufous; greater wing-coverts varying from greenish to purplish bronze, with black tips; primaries strongly barred black and white; secondaries similarly marked but white more or less spotted with brown; tertials indistinctly barred and mottled with black, rusty brown and buffy whitish, with purplish and greenish reflections on outer webs; thighs and lower abdomen dull black, feathers narrowly tipped with dull grayish white; feathers of flanks and under tail-coverts tipped with pale rufous (sometimes rusty whitish) with a narrow subterminal band of dark rufous succeeded by a much broader area of iridescent purplish bronze, the base of feathers on flanks dull black, but under tail-coverts barred with black and dark rufous. Spurs short and blunt, sometimes one or both absent. Barb on breast well developed.

Dimensions of type.—Wing, 520; tail, 400; culmen, 41; tarsus, 162.

Adult female in winter.—Head and upper neck usually with a strong growth of black, hair-like feathers; the females differ from males mainly in smaller size and the much duller, less iridescent plumage, less pronounced rufous markings about tail and browner wings; feathers of entire back bordered with gray; borders narrower and darker anteriorly, paler and broader posteriorly and shading into broad whitish tips on rump; the dark gray tips on middle and upper back with a peculiar dark greenish gloss in certain lights; feathers on underparts tipped with paler, more rusty gray than on back, the tips broadening posteriorly; under tail-coverts tipped with rusty white with a narrow subterminal bar of dark rufous.

General Notes.—All recent ornithologists have considered the

Wild Turkeys of Mexico and the southwestern United States (aside from *M. gallopavo intermedia*) as one form which was the ancestor of the domesticated bird. This idea is certainly erroneous as is shown by the series of specimens now in the collection of the Biological Survey. When the Spaniards first entered Mexico, they landed near the present city of Vera Cruz and made their way thence to the City of Mexico. At this time they found domesticated Turkeys among the Indians of that region and within a very few years the birds were introduced in Spain. The only part of the country occupied by the Spanish during the first few years of the Conquest, in which Wild Turkeys occur, is the eastern slope of the Cordillera in Vera Cruz, and there is every reason to suppose that this must have been the original home of the birds domesticated by the natives of that region.

In the 'Proceedings' of the Zoölogical Society for 1856 (page 61), Gould described *Meleagris mexicana* from a specimen obtained by Floresi. Mr. Floresi lived for some time at Bolaños, Jalisco, Mexico, where he had charge of a large mining plant for an English company also operating mines at Real del Monte, Hidalgo. Among the birds sent to England by Floresi, was the type of *Selasphorus floresi*, known to have come from Bolaños, and specimens of *Campephilus imperialis* and *Euptilotis neoxenus*, for which no locality was given, but as both species occur on the mountains within a few miles of Bolaños, it is altogether probable that they came from that place. Gould's description of the type of *Meleagris mexicana* is not sufficiently detailed to determine the exact character of his bird, but fortunately the type was figured in Elliot's 'Birds of North America' (Part X, pl. 1, with text, 1868), and the most distinctive characteristics—the green iridescence on the rump, the maculated and mottled (instead of barred) tail, and the absence of rufous about the tail and tail-coverts—are well shown. In addition Gould's type apparently served for the description of the adult male of *M. gallopavo* in the 'Catalogue of Birds of the British Museum' (XXII, page 387), and an adult female is described in the same volume from Ciudad Ranch, Durango.

These descriptions agree so closely with an adult male and

female obtained by me at El Salto, Durango, that there is little doubt Flores's specimens came from near Bolaños, which is a little farther south in the same part of the Sierra Madre. Although there are no specimens at hand from the State of Vera Cruz, whence must have come the original *M. gallopavo*, yet the climatic conditions are so different between the cold pine-covered mountain tops on the western side of the tableland frequented by Gould's *M. mexicana*, and the hot, humid tropical and subtropical mountain slopes on the eastern side of the tableland in Vera Cruz, the home of *M. gallopavo*, that there is scarcely a chance of the birds being the same.

Thus it will become necessary to treat *M. gallopavo* and *M. mexicana* as at least subspecifically distinct. Whatever may be the relationship of *M. mexicana* to *M. gallopavo*, the *M. g. merriami* is easily separable from *M. g. mexicana* of the Sierra Madre of western Mexico, from Chihuahua to Colima. Birds from northern Chihuahua are intermediate. In working out these two forms, I have had a fine series of thirteen specimens of *M. g. merriami*, including the type, obtained by Mr. E. A. Goldman near Winslow, Arizona, and nearly as many others representing intermediates from the Mexican border, and typical *M. gallopavo mexicana* from southern Durango.

I take pleasure in naming this handsome bird in honor of Dr. C. Hart Merriam, whose well-known biological survey of San Francisco Mountain was made within sight of the type locality.

Colaptes cafer collaris (Vig.).

Colaptes collaris VIGORS, Zool. Journ. IV, p. 354 (1829). Type from near Monterey, California.

General Notes.—The comparison of our large series of Mexican red-shafted Flickers with birds from California and the Rocky Mountain region demonstrates the truth of Mr. Ridgway's idea¹ that they represent two geographic races.

True *C. cafer* is restricted to the tablelands and mountains of Mexico, from near the northern border south to the State of Oaxaca. The birds of California and the Rocky Mountain

¹ Man. N. Am. Birds, 1887, p. 296, footnote.

region of the United States (except range of *C. c. saturation*) may be distinguished from true *C. cafer* by their larger size, decidedly longer bills, paler upper parts, more sparsely spotted under parts, and broader black tips to tail-feathers. Specimens from northern Mexico are intermediate. *C. cafer saturation* differs from *C. cafer* mainly in its larger size, less spotted breast, and paler gray on under side of neck.

***Myiozetetes similis superciliosus* (Bp.). TEXAS FLY-CATCHER.**

Tyrannus superciliosus BONAPARTE, P. Z. S. 1837, 118. Described from specimens taken in Guatemala. Bonaparte credits this name to Swainson but I have been unable to find any justification for this and must, therefore, cite Bonaparte as the authority for the name.

General Notes.—The bird usually recognized by American ornithologists as *Myiozetetes texensis* (Gir.) ranges from Panama north to the valley of the Rio Grande. After examining a large series from numerous localities within this wide range, I have been unable to detect any difference in color between specimens from the extremes of its habitat, but those from Panama are a little smaller than those from Costa Rica and thence northward. Specimens from Guatemala and Mexico are absolutely indistinguishable. This being the case, Bonaparte's name having four years priority over Giraud's *Tyrannula texensis*, and applying strictly to this bird, should replace the latter. From Panama south, there appears to be a direct gradation into the smaller, darker, more olive-backed *Myiozetetes similis* (Spix), Av. Bras., II, p. 18, pl. 25, of Brazil, and as a consequence the form north of Panama must stand as a subspecies under the designation given at the head of these notes.

***Sayornis nigricans* (Sw.) and its subspecies.**

Examination of the Black Flycatcher from various parts of its range reveals the existence of three recognizable subspecies. These have each been named, and below are given brief diagnoses of the forms with their ranges.

Sayornis nigricans (Sw.). Under tail-coverts white more or less broadly striped with dusky.

Distribution.—All of Mexico (except Yucatan and the Pacific coast from Colima to the northern border), and north into Texas, New Mexico, and southeastern Arizona.

General Notes.—Swainson described this bird from the "Tableland of Mexico." The type was in the Bullock collection, which was made in the region about the Valley of Mexico, so birds from that district may be considered typical.

Sayornis nigricans semiatra (Vigors). Under tail-coverts pure white.

Distribution.—Pacific coast of Mexico and the United States from Colima to Oregon, including most of Arizona.

General Notes.—Vigors described his bird from a specimen collected during the voyage of the 'Blossom' but gives no locality or habitat. The collection of birds made on the west coast of America during this voyage came mainly from near San Blas, Mexico, and Monterey, California; both within the range of the form having the pure white under tail-coverts. This being the case, we may consider birds from near Monterey, California, as typical.

Sayornis nigricans aquatica (Scl. & Salv.). Under tail-coverts dingy blackish.

Distribution.—Guatemala and south to Costa Rica. The type of this form was described from a specimen taken at Dueñas, Guatemala.

General Notes.—Specimens from Chiapas, Mexico, are midway between true *S. nigricans* and *S. aquatica* and there appears to be a regular gradation from one to the other. The same state of affairs exists to the north where the ranges of *S. nigricans* and *S. semiatra* join. Birds from Texas, New Mexico and Northern Mexico have much less distinctly dusky streaked under tail-coverts than those from Central Mexico, but should be referred to true *S. nigricans*. Both of these forms are thus found within the border of the United States.

Agelaius phœniceus sonoriensis Ridg.

In his 'Manual' Mr. Ridgway substituted Salvadori's *longirostris* for his own *sonoriensis* as a name for the Red-winged Blackbirds of Arizona and western Mexico, mainly because the habitat of *A. longirostris* was given as western Mexico. Salvadori described *A. longirostris* from a single adult male, and as the

measurements are about the only means of distinguishing the males of the various forms of *A. phoeniceus*, we must rely upon them to determine this bird's relationship. The measurements given for *A. longirostris* — wing, 111; tail, 81; culmen, 27; depth of bill, 10; tarsus, 28 — are sufficient to show that it is decidedly smaller with a longer and slenderer bill than the form described by Mr. Ridgway as *A. p. sonoriensis*. Five males of the latter from Culiacan, Sinaloa, Mexico, average: wing, 127; tail, 91; culmen, 22.5; tarsus, 31; and the smallest of the series measures, wing, 126; tail, 88; culmen, 23; tarsus, 31. South of Culiacan in Mexico the birds are still larger and to the north somewhat smaller, especially in Arizona, whence came the type of *A. p. sonoriensis*, but they never approach the dimensions given by Salvadori. After an examination of the considerable series of birds now available from various points in Arizona and western Mexico, from the Arizona border south to San Blas, Tepic, it is evident that the name *A. longirostris* cannot be properly applied to the bird named *A. p. sonoriensis* by Mr. Ridgway. It is very probable that the type of *A. longirostris* was attributed to western Mexico through some error in labeling.

A REVIEW OF THE THREE-TOED WOODPECKERS OF NORTH AMERICA.

BY OUTRAM BANGS.

IN North America, as is well known, two very different kinds of Three-toed Woodpeckers are found. These are the *Picoides arcticus* series (black-backed Three-toed Woodpeckers), and the *Picoides americanus* series (black-and-white-backed Three-toed Woodpeckers). Both are boreal species and over a very large extent of country a representative of each occur together. Both species may be subdivided into geographical races — *P. arcticus* into two, *P. americanus* into four. Of these six races, one of *P. arcticus*, inhabiting the Cascade Mountains, and one of *P. americanus*, found in Labrador, have not before been recognized. There is furthermore a mistake in the synonymy of *P. americanus* which makes it necessary to give the form of northern New Eng-

land, etc., a new name. In view of these facts, it seems well to publish this short review of the whole group.

Picoides arcticus is a purely American type. *Picoides americanus*, on the other hand, is the American representative of the *P. tridactylus* group.

Hargitt in the 'Catalogue of the Birds in the Collection of the British Museum' (Vol. XVIII, 1890), recognizes, beside the very different *P. funebris* of "Monpin, and the high wooded mountains of Western China," but two Old World forms—*P. tridactylus*, which he accords an immense range, over Europe and Asia, and *P. tridactylus crissoleucus* of central and northern Siberia and Kamtschatka. Other authors have, however, at various times considerably subdivided these two.

Any of the forms of *P. americanus* can always be distinguished from *P. tridactylus* by the pattern of coloration of the 2d and 3d outer rectrices. In *P. tridactylus* these feathers are barred all the way across with black and white, the black bars being usually the wider, and the base of the feathers pure black. In *P. americanus* these feathers are pure white, somewhat marked or barred with black basally. *P. tridactylus crissoleucus* has the outer rectrices much less barred with black than in true *P. tridactylus*, and in this respect approaches *P. americanus*. It differs from *P. americanus* in being much whiter—the crown pure white in the female and the sides, etc., with scarcely any dusky markings.

Both these Old World forms are larger than any of the *P. americanus* series, except *P. americanus dorsalis*, which sometimes nearly equals them in wing measurement.

SYNONYMY.

Picoides arcticus has escaped synonyms. It was described by Swainson, in 1831, as *Picus (Apternus) arcticus* (F. B. A., II, Birds, pp. xxvi and 313, pl. 57, 1831), from "a male killed near the sources of the Athabasca River, lat. 57°."

There are, however, two races—the typical one, extending from the northern Rocky Mountains to the Atlantic; the other inhabiting the Cascades, and Sierra Nevada of California.

Picoides americanus has a complicated synonymy. In most recent works one finds the name *Picoides americanus* dating from

Brehm, Handb. Vög. Deutschl., p. 195, 1831. Upon looking up this reference I was astonished to find that Brehm's name is a *nomen nudum* and must therefore be dropped. As I believe the work is rare, only two hundred copies having been printed, it may be well to quote Brehm's words. After descriptions of several of his European species, follows in a separate paragraph:

"Ausser den beiden Arten gibt es noch eine Art in Norwegen, welche von diesen verschieden ist und von mir *Picoides septentrionalis* genannt wird und eine grössere ohne zweifel verschiedene in Amerika welche *Picoides americanus* heissen kann." Then in another paragraph he gives the description of *P. septentrionalis*.

As all the forms of *P. americanus*, except *dorsalis* of the southern Rocky Mountains, are much smaller than *P. tridactylus*, the one qualifying word in Brehm ("grössere") is wrong. If *P. americanus* was in reality larger than *P. tridactylus*, Brehm's name even then, in my opinion, should not be considered for an instant.

The first tenable name for an American black-and-white-backed Three-toed Woodpecker appears to be *Picus* (*Apternus*) *americanus*, Swainson, Classif. of Birds, II, p. 306, 1837, apparently proposed entirely independently of Brehm, and based upon his own beautiful accurate plate and minute description of *Picus* (*Apternus*) *tridactylus* in Swainson and Richardson's F. B. A., II, Birds, pp. 311-312, pl. 56, species 104, 1831, "A male, killed near the sources of the Athabasca River, lat. 57°." This form has since been twice renamed, as follows: *Picoides americanus* var. *fasciatus* Baird, Cooper's Birds of Calif., I, pp. 385-386 (figure of head), 1870, from Fort Simpson, lat. 64°, and *P. tridactylus alascensis* Nelson, Auk, I, p. 165, 1884, from Fort Reliance, lat. (about) 67°.

The two forms of eastern North America — one in Labrador, the other in northern New England, etc. — appear to both need names, those heretofore used for them being untenable.

Tridactylia undulata Cab. & Heine, Mus. Hein., IV, p. 28, 1863, is not admissible, having been, together with several other names (*P. undatus* Temm. and *P. undosus* Cuv.) based on Brisson's *Pic varié de Cayenne*.¹

¹ Pl. Enl. 553 shows a bird with a red top to its head and four toes, two behind, two in front.

Picus hirsutus Vieill., Ois. de l'Am., II, p. 68, pl. 124, 1807 (*Tridactylia hirsuta* Steph., Shaw's Gen. Zool., IX, p. 219, pl. xxxviii, 1815), in part refers to an American form, though the figures and descriptions were evidently taken from an Old World specimen. This name has been used for an American bird by Wagler, Audubon, De Kay and others.

The form found in the southern Rocky Mountains stands as usually given — *P. americanus dorsalis* — though its northward range, as usually given, should be somewhat curtailed. It was described by Baird as *Picoides dorsalis* (B. N. A., p. 100, 1858), from Laramie Peak, Wyoming.

MATERIAL.

Dr. Robert Ridgway has kindly sent me all the skins of *P. americanus* contained in the National Museum from points in Alaska and the Northwest Territory, including the types of *P. americanus fasciatus* Baird and *P. tridactylus alascensis* Nelson; the series numbering 37 skins and fully proving that true *americanus*, *fasciatus* and *alascensis* are all the same.

I have also examined the large series of *Picoides* in Mr. William Brewster's collection, and a few skins in the collection of the Museum of Comparative Zoölogy at Cambridge. These, with the material in my brother's and my collection, and a series of specimens from northern Labrador lent me by Mr. J. D. Sornborger, makes a fine suite of specimens that leaves little to be desired.

The only region from which I have seen no skins is the central portion of Arctic America, where true *P. americanus* and its eastern races might be expected to intergrade.

I have also seen but two examples of *P. tridactylus*, both females; these two, however, are quite enough to show the differences between the Old World and the American forms.

Picoides arcticus arcticus (Swainson).

Picus (Apternus) arcticus SWAINSON, in Sw. and Rich. F. B. A. II, p. 313, plate, 57, 1831.

Picoides arcticus GRAY, Gen. B. I, p. 434, 1845.

Type Locality. — Sources of the Athabasca River, lat. 57° N. W. T.

Geographic Distribution.—Boreal America, from Newfoundland and southern Labrador west across the northern Rocky Mts. to Alaska, south to Minnesota and New York and casually to Massachusetts. A common species everywhere in the spruce and fir forest.

Specimens examined.—Total number 58; from the following localities.

Labrador: Bechoine, 1; Makkovik, 1.

Newfoundland: Codroy, 9; Flat Bay, 1.

New Brunswick: Milltown, 2; Restigouche River, 4.

Maine: Bangor, 2; Greenville, 1; Katharine Iron Works, 2; Upton, 9; Lake Umbagog, 12; Oxford Co., 3.

New York: Lyonsdale, Lewis Co., 1.

Michigan: Cadillac, 3.

Montana: Fort Shaw, 1.

Alberta: Red Deer, 5.

Massachusetts: Wareham, 1.

General Characters.—Size large (wing of adult ♂, 128.5 mm., of adult ♀, 124 mm.); back wholly shining blue-black; a narrow white frontal band; primaries not tipped with white; ♂ with a yellow crown patch; bill large and broad.

Color.—Upper parts shining blue-black, rump feathers with usually a few semi-concealed white spots; a narrow white frontal band; a short, narrow, white postocular stripe; a broad white malar stripe, meeting white frontal band, bordered by a black submalar stripe; nasal plumes mixed black and whitish; wings jet black, with little lustre; primaries spotted and notched with white, but without white tips; secondaries and tertials spotted on inner webs with white; wing-coverts unspotted; when wing is closed no white spots show except those on primaries; below white, heavily marked on sides and flanks with dusky; 2d and 3d rectrices barred and mottled basally with black, clear white (usually stained) for more than half their length; 4th rectrix black basally and at extreme tip, white for a short distance below tip, rest of tail black. Adult ♂ with a bright yellow crown patch, usually cadmium yellow, but in some specimens (young birds in first autumn or winter?) much paler; adult ♀ with whole top of head blue-black, except for white frontal band.

Remarks.—*P. arcticus* can at once be told from any other three-toed Woodpecker by its wholly blue-black back.

It has an enormous range over which it does not vary at all, specimens from the northern Rocky Mountains being indistinguishable from birds taken in New Brunswick and Maine, and even Newfoundland. Some males in autumn or winter have pale yellow crown patches. As it happens, I have seen more of these from Newfoundland than elsewhere, but the adult males in spring from Newfoundland have the crown patch dark yellow, and I

have examined a few skins from other places with light yellow crown patches. It is probably a character of the young male, though I have not seen enough carefully dissected specimens to be sure of this.

The range of seasonal variation in *P. arcticus* is likewise small. Winter specimens are, of course, in a fuller and longer plumage than summer ones, and examples in worn, faded mid-summer plumage are somewhat browner on the back and wings.

In the Cascade Mountains and Sierra Nevada of California true *P. arcticus* is replaced by a form having a peculiarly slender bill.

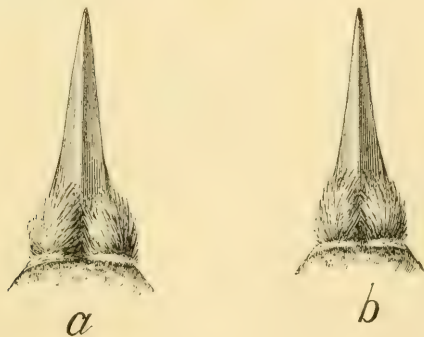
Picoides arcticus tenuirostris, subsp. nov.

Type, from Fort Klamath, Oregon, No. 19576, ♂ adult, Coll. of Wm. Brewster. Collected Dec. 13, 1886, by Dr. J. C. Merrill, U. S. A.

Geographic Distribution.—Cascade Mountains and Sierra Nevada of California, south to Lake Tahoe.

Specimens examined.—Total number, 4; all from the type locality.

Subspecific characters.—Averaging a little larger than true *P. arcticus* (wing of adult ♂, 130.5 mm., of adult ♀, 125 mm.); similar to true *P. arcticus* in color, except that the nasal plumes are blacker—less mixed with white; differing widely from true *P. arcticus* in the shape of the bill, which is long and extremely slender (greatest width of bill in true *P. arcticus*, ♂ ad. being 11.2 mm.; in *P. arcticus tenuirostris* ♂ ad. 8.8 mm.). See cut.



A. Bill of *P. arcticus arcticus* (No. 4525, Bangs Coll., from Red Deer Alberta, ♂ ad.).

B. Bill of *P. arcticus tenuirostris*. (Type, ♂ ad.).

Remarks.—That such a stable species as true *P. arcticus*, which does not vary from the Atlantic to the Rocky Mountains,

should suddenly break off into this peculiar slender-billed form in the Cascades is remarkable, and it is possible that *P. arcticus tenuirostris* is in reality an isolated species cut off geographically from the range of true *P. arcticus*.

The four skins I have seen, all from the type locality, are all alike, and in a large series of true *P. arcticus* there is not a single specimen that even approaches them in the shape of the bill.

Picoides americanus americanus (Swainson).

Picus (Apternus) americanus SWAINSON, *Classif. of Birds*, II, p. 306, 1837. Based upon plate and description of *Picus (Apternus) tridactylus* in Swains. & Rich. F. B. A. pp. 311-312, pl. 56, 1831. (Sources of the Athabasca River, N. W. T.)

Picoides americanus var. *fasciatus* BAIRD, *Cooper's B. of Calif.* I, pp. 385-386 (figure of head), 1870. (Fort Simpson, N. W. T.)

Picoides tridactylus alascensis NELSON, *Auk*, p. 165, 1884. (Fort Reliance, N. W. T.)

Picoides americanus alascensis (NELSON) No. 401a of the A. O. U. Check-List.

Type Locality. — Sources of the Athabasca River, N. W. T., lat. 57°.

Geographic Distribution. — Western boreal America and Alaska, south to Montana, Idaho and Assiniboia, in the Cascade Mountains, to the Washington line (49th Paral.), and on the coast at least to Saturna Island.

Specimens examined. — Total number, 45; from the following localities.

Alaska: Nulato, 6; Fort Yukon, 6; Yukon River, mouth of Porcupine River, 1; Fort Kenai, 3; Kodiak, 2; Nushagak River, 1; Unalaklik, 1; Putnam, 1.

Northwest Territory: Fort Reliance, 2 (including the type of *alascensis*); Fort Liard, 4; Fort Simpson, 3 (including the type of *fasciatus*); Fort Anderson, 2; Chiloweynck Lake, 2.

Alberta: Red Deer, 1.

Assiniboia: Near Grenfell, 1.

British Columbia: Cascade Mts., 49th Par., 3; Saturna Island, 2.

Idaho: West slope Bitterroot Mts., 1.

Montana: Columbia Falls, 3. (These three pretty typical *americanus* while two more from the same place approach *dorsalis*, one of them, in fact, being best referred to that race, except that it is smaller.)

General Characters. — Size small (wing of adult ♂, 117 mm., of adult ♀, 114 mm.). Ground color of back and wings brownish black, of head shining blue-black; back black and white — sometimes continuously white along middle line, but more often barred across with black and white, the white predominating; a white postocular stripe meeting white of nape; a white malar stripe; rump and upper tail-coverts usually barred or spotted with white; wings much spotted and notched with white —

the primaries tipped with white, and the wing-coverts frequently irregularly spotted with white; top of head much spotted or freckled with white; crown patch of ♂ bright yellow (lemon yellow to chrome, occasionally cadmium); sides, etc., heavily barred with dusky; 2d and 3d rectrices white, irregularly barred toward base of feathers with black.

Winter specimens, usually with more white above than summer specimens.

Color.—Ground color of back and wings brownish black, of head shining blue-black; nape white; back, from nape to rump, mixed black and white—the white usually predominating, but the pattern very variable—in some specimens the back is continuously white along middle line, in others the whole region is barred across with black and white; upper tail-coverts usually, but not always, irregularly spotted or barred with white; a white postocular stripe meeting white of nape; a white malar stripe, bordered by a black sub-malar stripe; auriculars and cervix shining blue-black; top of head (more noticeable in the ♀) heavily freckled with white—in many examples the white in excess of the black; nasal plumes mostly whitish, a few only being dusky; wings brownish black, primaries, secondaries and tertials conspicuously tipped, spotted and notched with white; wing-coverts often (but by no means always) irregularly spotted with white—the pattern often different on the opposite feathers; when closed, the wing shows much white; below white heavily barred on sides and flanks with dusky; under tail-coverts, white at ends, dusky at base, and sometimes barred; three outer rectrices white (usually stained, yellowish-brown) at ends, barred very irregularly, lower down the feathers with half bars and spots of black; 4th rectrix black with white end and one or two white spots lower down the feather; four middle rectrices black with a few white notches on both webs. Adult ♂ with a bright yellow crown patch, usually about chrome, though sometimes lemon yellow and sometimes cadmium; adult ♀ with whole top of head blue-black heavily freckled with white.

Remarks.—True *Picoides americanus* has a wide range through the western Fur Countries and Alaska and is a very variable bird. The variations, though partly seasonal, are to a great extent individual and consist in the greater or less amount of white in the back, head and wings.

The species has a curious history. It was at first confused with the Old World *P. tridactylus*, but in recent works has appeared as *P. americanus* Brehm. Brehm's name proves to be a *nomen nudum* and the species dates from Swainson, who figured and described the same form, afterwards named *fasciatus* by Baird, and still later *alascensis* by Nelson. The fine series before me proves conclusively that these three names apply strictly to one geographical form.

A fairly large series of skins from any one place within the range of the form will be sure to cover the whole range of variation. Thus the type of *alascensis*, from Fort Reliance, N. W. T., an adult ♂, killed in November, is one of the whitest examples before me — the whole back and rump are continuously white, the wings are very heavily marked with white and the wing-coverts thickly spotted, the upper tail-coverts are barred with white and the top of the head is more white than black, the crown patch is pale lemon yellow; on the other hand, No. 78614 from the same place, an adult ♂, also taken in November, stands at the opposite end of the range of variation; — the back is barred across with black and white in about equal amounts, the wing spots are all small and inconspicuous, the wing-coverts are unspotted, the upper tail-coverts with only one or two small white spots, and the head with but few white freckles; the crown patch is deep chrome. This specimen is a pretty good match for Swainson's plate of his type, except that it has the white bars on the back narrower than those of Swainson's figure. A series of six skins from Fort Yukon, and another of four skins from Fort Liard, each include examples of the whitest and of the darkest style. The two blackest specimens in the large series from the Northwest, are an adult ♀ taken Dec. 12 at Fort Simpson (No. 19426), and an adult ♀ taken Sept. 18 at Fort Yukon (No. 73378). These two are very similar; both have the minimum amount of white on the back and wings, unspotted wing-coverts, no white markings on upper tail-coverts, and the head in both is clear blue-black without white freckles. No. 19426 has the white postocular stripe, but even this is wanting in No. 73378, which might well pass for an eastern bird, having much the general appearance of specimens from Labrador.¹

As a rule summer specimens are blacker than winter ones, but individual variation is so great that this does not always hold true.

In the southern Rocky Mountains true *P. americanus* is replaced by a much larger form, *P. americanus dorsalis*, having the

¹ This skin was collected by Turner, and may be wrongly labeled, through some accident, as Turner collected both in Labrador and Alaska.

back always continuously white along the middle line. The two apparently intergrade in Montana.

In eastern North America true *P. americanus* is replaced by two races, one in Labrador the other in northern New England, etc. From either of these true *americanus* differs in the much greater amount of white in the upper parts, and in having a white postocular stripe. In the eastern forms this stripe is either wholly absent or indicated by an occasional isolated white feather or two. I do not know exactly where the eastern races meet true *P. americanus*, there being a dearth of specimens from the central portion of Arctic America.

In the Bangs Collection there are two examples of *P. americanus* from Saturna Island, B. C., that in every way are referable to the typical subspecies, except that the under parts are not pure white, but are pinkish smoke-gray — one skin showing this more strongly than the other. This coloring of the under parts is occasionally shown by eastern birds and may be due to staining.

Picoides americanus dorsalis Baird.

Picoides dorsalis BAIRD, B. N. A., p. 100, 1858.

Picoides americanus var. *dorsalis* BAIRD, Cooper's B. Calif., p. 386, 1870.

Type Locality. — Laramie Peak, Wyoming.

Geographic Distribution. — Southern Rocky Mountains, from New Mexico north to Montana, where intergradation takes place with true *americanus*.

Specimens examined. — Total number, 12; from the following localities.

New Mexico: Santa Fé Mountains, 1.

Colorado: Platte Cañon, 3; Jefferson Co., 2; Silverton, 1; Stony Gulch, 2; Beulah, 1.

Montana: Columbia Falls, 2 (intergrades; except in size, nearer *dorsalis* than true *americanus*).

Subspecific characters. — Size largest of the *americanus* series (wing of adult ♂, 126 mm., of adult ♀, 121 mm.); ground color of back and wings brownish black, of head shining blue-black; back from nape to rump continuously white along middle line, *not* barred across with black; white postocular and malar stripes broad and conspicuous; white markings and spots on primaries, secondaries and especially on inner webs of tertials, large; no white spots on wing-coverts; upper tail-coverts usually unspotted; top of head but little freckled with white; sides and flanks with fewer dusky markings, which are more like spots, less like

bars, than in true *americanus*; pattern of 2d and 3d rectrices usually, but not always, different from that of the other forms of the *americanus* series, the 2d rectrix being black basally, then white, and the 3d rectrix black for its basal half, then white, both feathers otherwise unbarred, though occasionally there is a white spot or two in the black basal portion, in both feathers the white extends down beyond the black on both outer and inner edges. In true *americanus* the 2d and 3d rectrices are usually spotted and half barred with black basally. Adult ♂ with a yellow crown patch, about chrome, smaller in extent and more mixed with black than is the crown patch in the other forms; adult ♀ with the whole top of the head shining blue-black, but little freckled with white. Bill usually longer and stouter than in any other forms of *americanus*.

Remarks.—*P. americanus dorsalis* is a large, alpine form of *americanus* inhabiting the southern Rocky Mountains. Montana appears to be the dividing line between it and true *americanus* and here at one place—Columbia Falls—one may get examples that approach true *americanus*, and others that are hardly distinguishable from *dorsalis*, except that all the Montana specimens are rather smaller than birds from farther south.

P. americanus dorsalis can always be told from true *americanus* by its larger size, stouter, longer bill, whiter—less marked with dusky—sides and the longitudinal white striping of the back. The smaller crown patch of the ♂ and the different pattern of the outer tail-feathers are additional characters that usually but not always distinguish this race from true *americanus*.

In any large series of true *americanus*, there will be sure to be some skins with the back continuously white and not barred with black; these have a look of *P. americanus dorsalis*, but their smaller size and shorter, lighter bills show they are not that form; the white portion of the back is also wider than in *P. americanus dorsalis*.

Picoides americanus bacatus,¹ subsp. nov.

Picoides americanus BREHM, No. 401, A. O. U. Check-List.

Type.—From Bangor, Maine, No. 802, ♂ adult, Coll. of E. A. and O. Bangs. Taken by E. S. Bowler, March 25, 1884; skinned and sexed by E. A. Bangs.

Geographic Distribution.—Eastern boreal America south of the St. Lawrence—south to the mountains of New York and rarely or casually

¹*Bacatus*, set with pearls. On account of the white of the back being reduced, in this form, to a series of spots.

to Massachusetts. Of rather local distribution throughout the spruce and fir forest, but commoner in the mountains than in the lowland forest.

Specimens examined.—Total number 21; from the following localities.

Maine: Bangor, 6; Mt. Katahdin, 1; Lake Umbagog, 5; Attian Pond, Moose River, 1; Upton, 1; Oxford Co., 1.

New Hampshire: Connecticut Lake, 1; Mt. Washington, 1; White Mountains, 1; Megalloway R., 2; Gorham, 1.

Subspecific characters.—Smallest of the *americanus* series (wing of adult ♂, 113.5 mm.; of adult ♀, 110 mm.); ground color of back and wings brownish black, of head shining blue-black; all the white markings on back much reduced, being usually a series of white spots confined to center of back from nape to rump; upper tail-coverts and wing-coverts usually unspotted (occasionally a few small, white spots on upper tail or wing-coverts or both); postocular stripe (so conspicuous in true *americanus*) wholly absent or indicated by only a few scattering white feathers; white malar stripe narrower than in true *americanus*; white markings on primaries, secondaries and tertials fewer and smaller; top of head in both sexes much less heavily freckled with white; adult ♂ with a bright yellow crown patch, about gamboge yellow;¹ otherwise similar to true *P. americanus*.

Remarks.—*P. americanus bacatus* is not a common bird in collections and much is still to be learned concerning its exact distribution. Most of the recorded specimens come from Maine, New Hampshire, and the Adirondack region of New York.

P. americanus bacatus is subject to much less variation, both individual and seasonal, than true *americanus*. There is, however, a slight amount of individual variation in the white markings above, some specimens showing a few white spots on the upper tail-coverts and wing-coverts, though these parts are usually black. The postocular stripe is more strongly indicated in some examples than in others, and the amount of white on the nape varies a little. This form can always be told from true *americanus* by the less amount of white everywhere above. It also averages smaller.

North of the St. Lawrence, becoming more and more strongly characterized as it extends up the Labrador coast, is a larger and much blacker form. This form and *P. americanus bacatus* appear to intergrade in Quebec. Where either of these eastern forms

¹ Young females, in nestling plumage, have a yellow crown patch, smaller than that of the adult male. I have seen nestlings of this form only, but probably the young female in other forms also has the yellow crown patch.

intergrade with true *americanus* is not known to me, but it is probably somewhere in northwestern Ontario.

***Picoides americanus labradorius*, subsp. nov.**

Type, from Okak, Labrador, No. 1365, ♂ adult, Coll. of J. D. Sornborger. Collected, June, 1895, by C. Schmitt.

Geographic Distribution.—Whole Labrador peninsula, north to tree limit, south into Quebec. Exact western limit of range unknown.

Specimens examined.—Total number 33; from the following localities.

Labrador: Okak, 8; Nain, 4; Hopedale, 3; Makkovik, 4; (northern Labrador), 1; Black Bay, 2; Lance au Loup, 2.

Quebec: Chaunay, 8 (not typical).

Anticosti Island: 1, (♀ juv., nestling plumage, probably this form).

Subspecific characters.—Larger than *P. americanus bacatus*, nearly equaling in size *P. americanus americanus* (wing of adult ♂, 116 mm.; of adult ♀, 113 mm.); ground color of back and wings jet black (brownish black in *P. americanus bacatus*), of head dark shining purplish blue-black, the shining blue-black of head reaching farther backward, covering sides of neck, nape and shoulders, and in fresh plumage often the whole back; all the white markings on back and wings even more reduced than in *P. americanus bacatus*; primaries sometimes not tipped with white, and the white spots on back, wings and head smaller and fewer; sides and flanks much more heavily marked with black—the markings themselves blacker and the pattern coarser; tail usually more barred with black, the second and third rectrices sometimes being barred nearly to the ends of the feathers; crown patch of ♂ darker yellow, about ochre yellow (that of *P. americanus bacatus* being about gamboge yellow).

Remarks.—*Picoides americanus labradorius* is the blackest of the American black-and-white-backed three-toed Woodpeckers, the ground color of the back being often as black and as shining as in *P. arcticus*. It differs noticeably from *P. americanus bacatus*, the only form with which it needs comparison, in its deep black wings and back, the heavy markings on the sides, and the darker yellow crown patch of the males, besides being a good deal larger.

P. americanus labradorius is generally distributed over eastern Labrador north to tree limit, and extends south into Quebec, becoming less well marked southward. A series in Mr. Brewster's Collection from Chaunay, Quebec, I refer to this form. They average smaller, however, than birds from northeastern Labrador, but their backs are much blacker and the crown patch of the males darker yellow than in *P. americanus bacatus*. Taken all together they are evidently intergrades, though nearer the northern than the southern form.

MEASUREMENTS OF *Picoides arcticus arcticus* (SWAINSON).

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
4648 ¹	♂	Mont., Fort Shaw.	129	80	23	36
4752 ⁹	♂	Alberta, Red Deer.	130	75	24	34
4525 ²	♂	" " "	129	77	23.2	36
4526	♂	" " "	129.5	82	23.2	34.5
18635 ¹	♂	Mich., Cadillac.	128	81	23	33
18636	♂	" " "	127	80	23	35
9845	♂	Lab., Bechoine.	131	79.5	24	34
46283	♂	Nfld, Codroy.	129	80	23	34
46284	♂	" " "	128	79	23.2	34
46287	♂	" " "	130	77.5	23.8	35
46288	♂	" " "	130	75	23.4	36
46402	♂	N. B., Milltown.	131	82	24	36
4520 ²	♂	N. B., Restigouche R.	127	81	24	35
4521	♂	" " "	126.5	77	23.2	33
4522	♂	" " "	129	82	23.2	33
800	♂	Me., Bangor.	128.5	82	24	36
30207 ¹	♂	Me., Lake Umbagog.	129	78	24	34.5
4510	♂	" " "	128.5	78	24	34.5
30350	♂	" " "	129.5	79.5	23.4	36
4524 ²	♂	Alberta, Red Deer.	127	79	22	33
4527	♂	" " "	124	80	22	33
— ³	♂	Lab., Makkovik.	125	82	22	32.5
46289 ¹	♂	Nfld, Codroy.	124.5	77	21.6	32
46290	♂	" " "	123	78	21.4	30
46403	♂	N. B., Milltown.	123.5	78	23	31.5
801 ²	♂	Me., Bangor.	126	80	21.8	32
11970 ¹	♂	Me., Lake Umbagog.	124	80	21	31.5
8109	♂	" " "	123	78	22	31
30208	♂	" " "	123	77	22	32
10949	♂	" " "	124.5	76.5	23	32

MEASUREMENTS OF *Picoides arcticus tenuirostris* BANGS.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
19576 ⁴	♂ (Type)	Oregon, Ft. Klamath.	132	83.5	22.6	36
19577	♂	" " "	129	80	22.2	35
19578	♂	" " "	125	81	22.2	33
26263	♂	" " "	125.5	84	21.8	33

¹ Coll. of Wm. Brewster.³ Coll. of J. D. Sornborger.² Coll. of E. A. & O. Bangs.⁴ Coll. of Wm. Brewster.

MEASUREMENTS OF *Picoides americanus americanus* (SWAINSON).

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
49905 ³	♂	Alaska, Nulato.	116	77	20.2	29
70809	♀	" "	117.5	74	20.4	30.5
49896	♀	" "	116	73	19.6	28
73376	♀	Alaska, Ft. Yukon.	118	79	20.6	30
76059	♀	" " "	117	73	20.2	29.5
124583	♀	" " "	117	76	20	29.5
58717	♀	Alaska, Ft. Kenai.	116.5	72	20.4	30
95273	♀	Alaska, Kadiak.	116	72	20.6	29
78614	♀	N. W. T., Ft. Reliance.	119	79	20	30
78615 ⁴	♀	" " "	117	75	20	—
19481	♀	N. W. T., Ft. Liard.	115	73	19	31
19414	♀	" " "	121	77	20	30.5
19423	♀	" " "	116	73.5	20	29.5
27126 ⁵	♀	N. W. T., Ft. Simpson.	118	75.5	20	30
43175	♀	N. W. T., Ft. Anderson.	118	77	19	31
1511 ²	♀	Assiniboia, Grenfell.	116.5	72.5	20	30
4509	♀	B. C., Saturna Island.	117	75	20.2	29
4510	♀	" " "	117.5	73	20.2	30.5
131496 ³	♀	Mont., Columbia Falls.	118	78	20.4	30
47299 ¹	♀	" " "	115	73.5	21.6	30
47300	♀	" " "	116	76	20.4	30
1510 ²	♀	" " "	117	70	20.8	31
70808 ³	♀	Alaska, Nulato.	112	74	19.6	27.5
78618	♀	" "	115	74	19.2	26.5
49894	♀	" "	113	75	19.4	28
73378	♀	Alaska, Ft. Yukon.	112.5	74.5	19.8	27.5
70812	♀	" " "	112	72	19.8	27.5
124584	♀	" " "	112	75.5	19.8	27.5
58719	♀	Alaska, Ft. Kenai.	114	73.5	19.4	29
54241	♀	Alaska, Kadiak.	112.5	77	20	26.5
19413	♀	N. W. T., Ft. Liard.	112	74	18.6	26
19426	♀	N. W. T., Ft. Simpson.	115.5	76	19.6	26
22599	♀	" " "	116.5	73	19	26.5
43176	♀	N. W. T., Ft. Anderson.	113.5	76.5	20	27
47358 ¹	♀	B. C., Cascade Mts., 49th Par.	113	71	19.6	27.5
45600	♀	" " " " "	110.5	69	19.2	27
131497 ³	♀	Mont., Columbia Falls.	117	73	20	26.5

¹ Coll. of Wm. Brewster.⁴ Type of *alasceus*.² Coll. of E. A. & O. Bangs.⁵ Type of *fasciatus*.³ Coll. of U. S. National Museum.

(NOTE: The specimens from Columbia Falls, Montana, are all referable by measurements to *P. americanus americanus*; two out of the five, however, in all other respects are nearer to *P. americanus dorsalis*.)

MEASUREMENTS OF *Picoides americanus dorsalis* BAIRD.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
9818 ¹	♂	N. M., Santa Fé Mts.	127	76	21.6	32
46400	♂	Col., Stony Gulch.	126	78	21.2	30
805 ²	♂	Col., Platte Cañon.	127	76	21.8	32
1512	♂	Col., Jefferson Co.	124	—	20.4	32
1513	♂	Col., Beulah.	125	76	20.4	31.5
46401 ¹	♂	Col., Stony Gulch.	124	79	20.6	29
9913	♂	Col., Platte Cañon.	119	76	20.2	29.5
804 ²	♂	" " "	123.5	76.5	21	31
26036 ¹	♂	Col., Jefferson Co.	118	73.5	20.8	29
9904	♂	Col., Silverton.	121	81	21	30

MEASUREMENTS OF *Picoides americanus bacatus* BANGS.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
802 ⁴	♂ (Type)	Me., Bangor.	113	75	20.2	28.5
453 ¹	♂	" "	111	72	20	29.5
453 ²	♂	" "	112	73.5	20.4	29
30209 ³	♂	Me., Lake Umbagog.	113	72	20	29
26281	♂	" " "	115	73	21	29.5
10975	♂	" " "	112	72	20.8	28.5
1293	♂	Me., Upton.	114.5	72	21	28.5
3414	♂	Me., Attian Pond, Moose R.	114.5	72	19.6	29
46399	♂	Me., Mt. Katahdin.	115	73	20.2	29
42611	♂	N. H., White Mts.	115	72.5	20	28
1292	♂	N. H., Gorham.	114	74	21	30
30767	♂	N. H., Megalloway R.	113.5	73.5	20.2	28
803 ⁴	♂	Me., Bangor.	110	72	19.8	26
453 ⁰	♂	" "	111	74	20	26
4529	♂	" "	110.5	74	19.8	27
26282 ³	♂	Me., Lake Umbagog.	110	75	19.8	—
9585	♂	" " "	110	74.5	19.6	26
25647	♂	Me., Upton.	110	70	19.2	26.5
30768	♂	N. H., Megalloway R.	110	70	19.2	26

¹ Coll. of Wm. Brewster.² Coll. of E. A. & O. Bangs.³ Coll. of Wm. Brewster.⁴ Coll. of E. A. & O. Bangs.

MEASUREMENTS OF *Picoides americanus bacatus* + *labradorius*.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
7382 ¹	♂	Queb., Chaunay.	113	75	20.6	30
7378	♀	" "	115	73	20.2	30
7380	♀	" "	114	73.5	20.2	29
7381	♀	" "	113	75	20	29
7383	♀	" "	113	72.5	19.8	26
7386	♀	" "	112.5	73	19.2	25.5
7379	♀	" "	111.5	75.5	20	26
7384	+	" "	111	71	19.2	26

MEASUREMENTS OF *Picoides americanus labradorius* BANGS.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
1365 ²	♂ (Type)	Lab., Okak.	119	81	20.4	29
1366	♀	" "	116	73	21	29
1360	♀	" "	118	73.5	20.2	28
1370	♀	Lab., Nain.	115	65	20	28.5
1367	♀	" "	115.5	61	21	29
1354	♀	Lab., Hopedale.	116	77.5	21	28.5
1356	♀	" "	115.5	72	20.2	28
4497 ³	♀	Lab., Makkovik.	117	75	21	30
4500	♀	Lab., Lance au Loup.	115	73.5	20.2	30
4499	♀	Lab., Black Bay.	116	74	21	28.5
1363 ²	♀	" "	115	74	21	28
1358	♀	Lab., Okak.	114	78	20.2	27
1358	♀	" "	112	75	19.6	26
1359	♀	" "	112.5	76.5	20	26
1361	♀	" "	111.5	72.5	20	27
1362	♀	" "	114	77.5	19.4	25.5
1369	♀	Lab., Nain.	110	72.5	19.2	28
1368	♀	" "	116	80	21	27.5
1355	♀	Lab., Hopedale.	112	76	20	28
—	♀	Lab., Makkovik.	115	74	19.2	26.5
—	♀	" "	112.5	75.5	20	27
4498 ³	+	Lab., Lance au Loup.	114.5	75.5	20	27

¹ Coll. of Wm. Brewster.² Coll. of J. D. Sornborger.³ Coll. of E. A. & O. Bangs.

THE MOULT OF THE NORTH AMERICAN *TETRAONIDÆ* (QUAILS, PARTRIDGES AND GROUSE).

BY JONATHAN DWIGHT, JR., M.D.

Plates IV and V.

(Concluded from page 51.)

Dendragapus obscurus (*Say*). DUSKY GROUSE.

"	"	fuliginosus (<i>Ridgw.</i>) SOOTY GROUSE.
"	"	richardsonii (<i>Dougl.</i>) RICHARDSON'S GROUSE.

The material examined, although not very extensive, shows the same sequence of plumages and moults as among the Quails.

Natal Down. — Above rich buff mottled with black and spotted with black on the forehead and sides of the head. Below dull buffy white. Two specimens of *obscurus* (Amer. Mus. Nos. 63989 and 63990, Utah, June 15) are mere chicks; but much of the juvenal plumage has grown on the upper surface and the first and second primaries are just in sight, the others being far more advanced, while the tail is also visible.

Juvenal Plumage, acquired by a complete postnatal moult. Above grayish brown with buff or whitish shaft-streaks and irregular barring or mottling of black, buff and gray; the crown reddish tinged. Below chiefly white with a thick sprinkling of black spots except on the chin. Two specimens of *fuliginosus*, about half grown (Amer. Mus. Nos. 45275 and 45276, July 12 and 13, British Columbia), illustrate this plumage and the early appearance of the postjuvenal moult, the first and second primaries still growing while the seventh to the tenth have been already renewed.

First Winter Plumage, acquired by a complete postjuvenal moult, excepting the two distal primaries of each wing. A dress practically adult is assumed at this stage.

First Nuptial Plumage. — There is no material showing prenuptial moult, but it must be very restricted, judging by breeding

birds. Later plumages are repetitions of the winter and summer dress.

***Dendragapus canadensis* (Linn.). CANADA GROUSE.**

Natal Down.—Above rusty buff with dusky mottling. Black spots at nostrils, on forehead, on lores and behind the eye. A rufous patch bordered with black on the occiput. Below pale straw yellow.

Juvenal Plumage, acquired by a complete postnatal moult. Very similar to the adult female dress but browner above, rustier on the crown, neck and throat, whiter on chin, and with the pattern of the flank feathers quite different. A bird in my collection (J. Dwight, Jr., No. 1367, ♂, Nova Scotia, August 9) shows new black, white-tipped body feathers laterally on the breast, the first of the winter dress. Of the remiges belonging to the juvenal plumage, the first and second are nearly matured, the third is worn and with the buff edging of this stage, the fourth is a mere pin point, the others up to the eighth secondary (the eighteenth remex) are new and the remainder old. The rectrices of the first winter are partly grown. The sexes are alike in this plumage.

First Winter Plumage, acquired by a complete postjuvenal moult. Young birds become practically indistinguishable from adults, the black areas, however, are less solidly black and the white edgings broader. October birds examined show no further signs of moult. It is of interest to note that the black feathers of the chin and sides of the head are basally white, those nearest the white markings, as the throat crescent and head spots, having the largest areas of white. Furthermore one web of the feathers situated at the side of the white areas may be white and the other black, — a point that is of more significance, as will be seen, in *Lagopus*. The amount of white in both genera is apparently greater in the younger birds.

First Nuptial Plumage. — I can throw no light on the subject of a prenuptial moult. August birds in my collection are much worn about the chin, the area most involved when moult occurs in allied species.

Second or Adult Winter Plumage, acquired by a complete post-

nuptial moult, nearly completed except on the neck and throat as early as mid-August. Two males (J. Dwight, Jr., No. 1365, Nova Scotia, Aug. 9, and No. 1393, Nova Scotia, Aug. 13) have already lost the old distal primaries, the new ones being still somewhat pulpy and little of the worn body plumage remains.

Later plumages are repetitions of those already described.

Dendragapus franklinii (*Dougl.*). FRANKLIN'S GROUSE.

I have seen no material which throws any light on the moult of this species.

Bonasa umbellus (*Linn.*). RUFFED GROUSE.

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| " | " | togata (<i>Linn.</i>). CANADIAN RUFFED GROUSE. |
| " | " | umbelloides (<i>Dougl.</i>). GRAY RUFFED GROUSE. |
| " | " | sabini (<i>Dougl.</i>). OREGON RUFFED GROUSE. |

The material examined indicates precisely similar moults in all the races of this species. The renewal of the remiges by the postjuvénal moult begins when the birds are only about one half grown, a striking characteristic of all the Tetraonidæ, and I have been able to trace all the interesting stages of plumage in the young bird by a series of *Bonasa* that includes all sizes from the chick to the full grown bird. The moult of *Bonasa* is typical of the whole family of Grouse and Quails.

Natal Down. — Above chestnut, paler on the crown, mottled on the body; a dull black postocular line. Below pale buff or primrose yellow, brightest on the chin, and a faintly brownish collar. A downy chick of *umbellus* (Amer. Mus. No. 25344, New York, May 27) has eight primaries and nine secondaries with their coverts barely breaking from their sheaths; the first and second primaries and the inner secondaries are not yet visible.

Two chicks of *umbellus* (Amer. Mus. No. 51447, New York, May 30, and L. B. Bishop, No. 2889, Connecticut, June 3) are slightly more advanced. Another of *umbellus* (L. B. Bishop, No. 2946, Connecticut, June 29) shows the distal pair of primaries, the rest of the wings better grown and new body feathers coming in at the sides of the breast and on the back at the root

of the neck. A chick of *togata* (J. Dwight, Jr., No. 5964, ♀, Quebec, July 1) has the remiges well developed except the two distal and a few proximal. The tail is beginning to show as the rectrices push out the tufts of down surmounting them; the wing-coverts are well grown; and the sides of the breast are covered with new feathers which have also begun to appear in the anterior dorsal and lumbar regions and on the throat and crown. No. 5968, ♂, of the same brood, three days older, shows a little more tail and more feathers on the crown. No. 5978, ♀, of the same brood, eight days older, shows a couple of inches of tail and has already begun the postjuvenile moult of the primaries, the eighth, ninth and tenth having fallen out. The chin, throat, forehead, superciliary stripes and mid-abdomen are still downy.

Juvenile Plumage, acquired by a complete postnatal moult. It is at its full development when the birds are less than three quarters grown, the loss of the remiges by the postjuvenile moult beginning very early. This plumage is similar to that of the adult female, but is browner with paler and less distinct barring, the chin white instead of buff, the rectrices more distinctly barred, and the remiges with wider and more mottled outer webs. There are no neck tufts, males and females being practically indistinguishable at this stage. A specimen of *togata* (J. Dwight, Jr., No. 4166, ♂, Quebec, July 24) is not much more advanced than No. 5978, but is double the size and has very little down left on the chin. Two other males (J. Dwight, Jr., Nos 1363 and 1364, Nova Scotia, August 7,) have renewed the primaries from the tenth outward as far as the fifth, and the body feathers also of the first winter plumage are appearing on the breast laterally and on the back. Several other specimens in the American Museum are at about the same stage (Amer. Mus. No. 57877, Manitoba, August 6, and No. 55575, Wisconsin, August 24).

First Winter Plumage, acquired by a complete postjuvenile moult, except the two distal primaries. The full adult dress is assumed, males becoming distinguishable from females by the more prominent black neck tufts now acquired for the first time. A specimen of *togata* (J. Dwight, Jr., No. 224, ♀, New Hampshire, Sept. 10) has assumed this plumage except for the head and throat, and the third and fourth primaries, while buff-

spotted under wing-coverts have replaced the gray ones of the juvenal stage. Numerous October specimens examined have lost all traces of moult except in some of them on the border line between the breast and throat. The 'ruff' of young males is not so deep a black as that of adults and the barring of the lower parts is less extensive and somewhat paler, but plumage characters cannot be absolutely depended upon to distinguish young from old.

First Nuptial Plumage, acquired by a limited prenuptial moult confined to the head and chin. A specimen of *sabini* (Amer. Mus. No. 47282, British Columbia, June 2) shows numerous pin feathers on the chin, throat, sides of head and forehead. Another *sabini* (Amer. Mus. No. 47279, ♂, British Columbia, May 20) also shows a few pin feathers. A few other spring and summer birds of other races have been obtained too early or too late (*i. e.*, March or June) to show positive signs of moult.

Later plumages are repetitions of the winter and summer dress.

Lagopus lagopus (*Linn.*). WILLOW PTARMIGAN.

“ “ **alleni** *Stejn.* ALLEN'S PTARMIGAN.

The series of Ptarmigans in the American Museum of Natural History and in the U. S. National Museum, together with specimens from Alaska kindly loaned me by Dr. Louis B. Bishop, and a few in my own collection, illustrates most effectively all the plumages and moults of these Arctic birds. The study of this material, amounting to nearly two hundred specimens, now enables me to explain the parti-colored plumages of these birds, a matter that has long baffled investigation and given rise to a belief that the individual feathers themselves change color without being moulted. It has also been believed by some that Ptarmigans moult continuously and in a hap-hazard way during the whole year. All of these ideas have arisen from a misconception of the facts, which show that the feathers supposed to be changing color or pattern are of that particular color and pattern at the time they first expand, that the continuous moult resolves itself into definite periods, and that the feather growth is systematic, differing in no respect from that of the rest of the Grouse. The

one essential difference between the moults of the Ptarmigans and those of the Grouse is found in the extra moult in the autumn by which the brown feathers regularly assumed at the usual periods of moult in both young birds and old are replaced by white ones.

As for the prenuptial moult, it may or may not be more extensive than among the Grouse, the extent of renewal varying apparently with the latitude. Birds living in lands of eternal snow appear to assume very few dark feathers, chiefly about the head, as the brief Arctic summer sets in. Those of lower latitudes undergo a more extensive moult, which, however, never includes the remiges nor the rectrices. Besides this, as females seem to assume more dark feathers than do males, we are led to the conclusion that the Ptarmigans are a remarkable instance of protective coloration, and that their plumage is modified to suit their environment. We know them best in their winter dress, snow white with black rectrices hidden by white coverts, and can understand how readily they harmonize with a snowy landscape, being thus protected from their enemies. With the melting of the snow they don a dusky dress mottled with buff, which is confined chiefly to the upper parts. A little later the annual moult takes place, including practically the whole plumage, and a reddish brown dress is assumed upon the back, head and breast, the remainder of the body and the wings becoming white. An extra moult shortly after removes the brown feathers. If white were assumed everywhere at the time of the annual or postnuptial moult, which begins as early as July, it would not be protective; but why the postnuptial moult should not be postponed until white would be protective, is a theoretical matter that need not concern us. The salient fact is the occurrence of a moult similar to one characteristic of a number of the Ducks and observed, although not understood, many years ago. A description of it as noticed in the Mallard may be instructively read in this connection.¹ Further details of this moult among certain Ducks have been published by Mr. Witmer Stone² and Mr. F. M. Chapman.³

¹ Waterton, Loudon's Mag. Nat. Hist., VIII, 1835, p. 544.

² Proc. Acad. Nat. Sci. Phila., 1899, pp. 467-472.

³ Bull. Amer. Mus. Nat. Hist., XII, 1899, pp. 231-240.

This extra moult so quickly succeeds the one preceding it that new brown and new white feathers may be found almost side by side. If, however, we bear in mind how feather growth radiates more or less symmetrically from definite points, we can distinguish two moults rather than two stages of one, and if we could trace the history of each individual feather, we would doubtless find it subject to the same laws which govern the development of plumage in all species of birds. The difficulty arises of designating the intermediate stage of plumage by a name. It exactly corresponds to the 'autumnal' or 'winter' plumage of most birds, but part of it is soon renewed by the extra moult. It seems to me it might best be called the *preliminary winter plumage*, which, when the brown feathers have been replaced, becomes the *supplementary winter plumage*. One thing is evident — the brown or dusky stage does not properly belong to the nuptial or summer plumage, for its appearance is synchronous with the postnuptial renewal which begins among the remiges. Young birds also pass through a preliminary winter plumage following the juvenal, assuming by the postjuvenal moult a dress that is scarcely different from the corresponding stage of adult plumage, although the brown feathers acquired are fewer and more scattered. As in the adult, this plumage is also followed by a wholly white supplementary winter dress.

The plumages of the Ptarmigans are puzzling not only on account of the plumage intermediate between summer and winter dress, but also on account of the rapidity with which the moults follow each other, one beginning before the previous one is completed, and apparently overlapping it at some points. Moreover, the incompleteness of the partial moults with the irregular retention of feathers peculiar to them adds to the confusion of ideas resulting from seeing together an assemblage of feathers belonging to several different stages of plumage. As for the rapidity with which one moult treads upon the heels of another, it can only be said that the mode of life of the Ptarmigans requires it and the activity of a feather papilla is no greater than the necessity. As a matter of fact, some papillæ produce approximately one feather in May, another in July and a third in September, but there are many which produce but two feathers

during this period and others only one, while all of them are dormant during the long winters. The 'generations' of feathers are most frequent where the blood supply is richest. Problems of plumage solve themselves as soon as we can say when and where each feather grows, and a comprehension of the idea of sequence is the key to the whole matter.

Before taking up the series of plumages and moults in their natural order of development in the Ptarmigans, I wish to call attention to Plate IV which shows the four constant types of feathers found upon *Lagopus lagopus*. It is the mingling of the four that has proved a stumbling block to many observers. Fig. 1 represents one type, the juvenal plumage; Figs. 2, 3, and 10 a second type, the preliminary winter plumage; Figs. 4 and 11 a third type, the supplementary winter plumage; and Figs. 5-9 a fourth type, the nuptial plumage. That feathers of all of these types grow at definite times is amply shown by many of the series of birds examined and is illustrated by Figs. 9, 10 and 11 which show new feathers still clasped by their sheaths; but it must be remembered, there is some tendency for one type to run into another. My object is to indicate when and where these types grow and how they are modified in color and pattern by age, sex, individuals, and particularly by position. If observers would pay attention to a few of these matters first we would hear very little afterwards about color change without moult. The parti-colored feathers are principally on the line of demarkation between light and dark areas, and the same style of feathers will always be found upon corresponding areas of birds taken at the same stage of development. The feathers of the second type, for instance, always show an amount of white basally which varies with the position they occupy in the feather tracts. The white, too, is most extensive upon the webs nearest white areas, just as it is in *Dendragapus*, or any other species with contrasting colors. This may be seen by examination of the feathers of the mesial borders of the sternal bands of the ventral feather tract where dark parti-colored feathers largely tipped or variegated with white are regularly produced at the postnatal, postnuptial and prenuptial moults. The triangular wedge of ventral feather tract extending between the sternal bands produces only white feathers at the



PTARMIGAN FEATHERS.



FIG. 1. DOWN FEATHER OF PTARMIGAN.



FIG. 2. DOWN FEATHER OF QUAIL.

postjuvenal and postnuptial moults, such feathers appearing upon the sternal bands at a later period, namely, at the supplementary postjuvenal and supplementary postnuptial moults. There is no theory about any of these matters,—the facts are patent only they have not been understood. Nor is it an easy matter to understand them without following them in detail, but this is just what I propose to do, and I am glad to say the series I have examined forms a complete chain of plumages in which even the intermediate links of moult are not missing. It is only by tracing the development of the successive ‘generations’ of feathers peculiar to each feather tract and studying their relation to each other, that we may arrive at the true explanation of the apparently hopeless confusion of variously colored feathers found upon the Ptarmigans during the summer months. Instead of confusion we find each tract and each feather governed by the usual laws of feather growth, and the only confusion discoverable is that existing in the minds of those who have not grasped the facts. What these facts are I have already endeavored to sum up, but they will become still clearer if the reader will follow me through the pages which follow. As with the other Grouse and Quail the sequence of plumages and moults is illustrated by specimens studied in the natural order in which the plumages have developed. We will begin with *Lagopus lagopus*.

Natal Down.—Downy chicks are mottled above with rusty brown and dull black, the crown is chestnut and a dark line runs behind the eye; below they are a pale buff yellow. This down, shown in Plate V, from a photomicrograph by Dr. Edward Leaming, varies little upon different parts of the body or in different species of the Tetraonidæ. Fig. 1 represents it attached to the apex of a juvenal feather of *Lagopus lagopus* and Fig. 2 shows it similarly attached to a juvenal feather of *Colinus virginianus*, the former plucked from the humeral tract, the latter from the chin where the down is shorter. It is found not only at the apices of the body feathers but at those of the flight-feathers and of the rectrices, being practically continuous with the barbs of the succeeding feathers, the tips often breaking away with the confining band which gathers them into a bundle.

A downy chick (Amer. Mus. No. 26178, Labrador, July 1,

"five days old"), is just beginning to show the sprouting juvenal remiges, the outer ones being least developed. Another chick (Amer. Mus. No. 26179, Labrador, June 29, "twelve days old") has the wing-quills and coverts well out of their sheaths, and some of the brown rectrices are beginning to show, together with a few dusky, white-tipped feathers of the humeral tracts. Still another (Amer. Mus. No. 26177, Labrador, July 22) is slightly more advanced, new juvenal feathers expanding on the sides of the breast, anteriorly on the back, on the rump, and on the lumbar tracts, while eight primaries are partly grown, the first and second or distal pair of each wing not yet showing. Several specimens in the U. S. National Museum are well advanced into the next plumage and need not be particularly described.

Juvenal Plumage.— This dress is acquired by a complete post-natal moult beginning shortly after the chick leaves the egg and practically ends before the bird is more than half grown, the natal down persisting longest on the chin, throat, sides of neck and abdomen. This plumage is of the first type as shown by Plate I, Fig. 1, dusky above and variously barred, mottled and edged with rich ochraceous buff, many of the feathers being narrowly tipped with white, while a richer buff prevails below; the dusky markings are reduced to irregular bars, and to mere spots upon the chin and upper throat, where the buff is very pale and the feathers white basally as well as terminally. The abdomen (including the wedge of the ventral feather tract extending to the neck), the flanks, the crissum, the tibiae, tarsi and toes become dull yellowish white, the flanks, crissum and upper part of the tibiae being obscurely barred and having a rusty tinge. It should be noted that the feathers adjacent to the mesial borders of the sternal bands approach type two, being dusky, often finely mottled and showing basally and terminally large areas of white. Similar feathers also grow at the postnuptial moult scattered irregularly, chiefly along the external border of these bands, but the two kinds may be distinguished by the greater wear showing upon the earlier developed feathers. The juvenal remiges are grayish brown somewhat mottled with buff, except the two distal primaries which are white, sometimes speckled with dull black terminally. The late development of the first and second primary, usually long after the

third is grown, suggests the idea of classing them as part of the winter plumage. As, however, they belong to the series which develops before the postjuvenile moult begins, it seems best to class them with the juvenal dress, as I have consistently done in describing the other Grouse and Quails. The juvenal rectrices are deep brown barred with reddish brown and narrowly tipped with white. Males and females are practically indistinguishable in juvenal dress.

The early appearance of the postjuvenile moult when the birds are hardly half grown is not peculiar to the Ptarmigans, but the appearance of new white primaries at both ends of a brown series is confusing unless the origin of these feathers is thoroughly understood. Several birds illustrate this stage. One of them (Am. Mus. No. 26176, Labrador, July 22), hardly half grown and still downy about the head, has replaced the ninth and tenth juvenal primaries by white ones just breaking from their sheaths; the ninth is a mere pin point, while the white first and second are nearly grown and still pulpy, the brown third primary showing traces of its immaturity by the persistent scaly sheath at its base. Except about the head and throat the juvenal plumage of the body has been mostly acquired. Another bird, the date of capture lacking (Am. Mus. No. 45191, Labrador) is more advanced, the tenth primary being well grown and only the third to the sixth of the brown ones remain. The juvenal tail is still retained. Still another bird two thirds grown (Am. Mus. No. 26175) retains only the third and fourth of the brown juvenal primaries although juvenal feathers are still expanding on the back, head and throat.

First Winter Plumage (preliminary), acquired by a postnuptial moult which is generally very incomplete in birds of the far North, but more extensive in those of lower latitudes. A mere sprinkling of reddish brown finely vermiculated or mottled feathers of the type shown by Plate 1, Figs. 2, 3 and 10, may be acquired or the renewal may be complete, the abdomen, flanks, legs and feet, however, always assuming at this moult pure white feathers of the type shown by Figs. 4 and 11. The remiges except the two distal primaries, which are not moulted, and most of the wing-coverts are replaced by white ones. A few proximal remiges that correspond to tertiaries, and a couple of rows of

median coverts are not moulted until later, the postjuvénal moult overlapping in a measure the limited one succeeding it. The black tail tipped with white is acquired at the postnuptial moult, the median pair of rectrices being latest in development, the rest of the series all being renewed at nearly the same time. There are fourteen black rectrices. The two central feathers usually reckoned as rectrices appear to be in the row of coverts which they certainly follow in their moult, developing white and being renewed, when they are renewed, at a later period than are the black rectrices. The rectrices are moulted once in the year, the coverts often twice and a few of them three times.

Males and females in this intermediate plumage are not usually distinguishable, although the latter may be duller and with more tendency to barring, especially on the breast. A female scarcely full grown (Amer. Mus. No. 26173, Labrador, August 27) has assumed much of the preliminary plumage and is already beginning to show a few white feathers of the supplementary stage. Some body feathers of the juvenal stage are retained, including a few parti-colored ones on the inner margin of the sternal bands; the third primary is brown and also one feather of the alula. The tail is perhaps one quarter grown. New white feathers are growing systematically upon the abdomen, legs and toes, the points of first development for the toes being each joint. Two other birds (L. B. Bishop, No. 4503, ♀, and No. 4506, ♂, Yukon Delta, Alaska, August 28) are at about the same stage, but have assumed a few reddish feathers, chiefly on the breast. The first and second primaries have lost almost all traces of immaturity, the third has not been replaced and is brown, the fourth is only one half grown, and the fifth merely shows the remains of its sheath. At about the eighteenth remex partly grown feathers will be found, and the rest of the series is not yet renewed, but an exact count is extremely difficult in all dried and distorted wings. Worn parti-colored feathers occur on the sternal bands adjacent to the ventral wedge, which is beginning to be clothed with pure white feathers replacing yellowish ones, but these variegated feathers will be renewed when the moult just beginning at the anterior part of the sternal bands reaches them, as will the external barred buff feathers that sweep backward over the flanks. The advance of the

two moults practically side by side, apparently in three parallel bands, on the breast and abdomen may be traced in a number of specimens which illustrate it. A female (Amer. Mus. No. 26169, Labrador, September 5) has assumed wings almost wholly white; the third primary is a mere pin point, its brown juvenal covert still retained, and the inward course of the moult has reached the eighteenth remex. The new white one is just visible, the seventeenth half grown, and the inner members are as yet unmoulted. The median coverts and a few dusky lesser coverts are still retained. New white feathers are growing among the axillaries and upon the flanks and abdomen at the places where they regularly develop. Four other birds (L. B. Bishop, No. 4504, ♀, No. 4505, ♂, No. 4507, ♂, and No. 4509, ♂, Alaska, August 28) are at about the same stage or slightly more advanced. The third primary of each is now white and one half grown while they still retain a brown feather of the alula and some brown ones of the carpo-metacarpal border. In two others (L. B. Bishop, No. 4502, ♂, and No. 4508, ♂, Alaska, August 28) the white of the sternal bands is more prominent and the tails a little longer.

A female (L. B. Bishop, No. 4597, Alaska, Sept. 11) is still further along, white feathers beginning to appear about the chin and throat. Another bird (L. B. Bishop, No. 4657, Alaska, Sept. 19) has become almost wholly white on the abdomen except a few feathers of the flanks, and new white feathers of the supplementary winter dress are growing at the usual initial points of development on the breast, throat, chin, head and back. Three more (L. B. Bishop, No. 4655, ♂, No. 4656, ♀, and 4658, ♀, Alaska, Sept. 19) differ little from the last although the white middle pair of tail-coverts is now in sight taking the place of the juvenal feathers. A specimen evidently *alleni* (Amer. Mus. No. 45195, wrongly labelled "Nova Scotia, summer") illustrates the full development of the preliminary winter plumage, the wings being absolutely white although the inner remiges show signs of recent growth. The upper parts and breast are almost wholly of the reddish second type of feather, the abdomen wholly white, as are the flanks, legs and toes.

First Winter Plumage (supplementary), acquired by a partial supplementary postjuvenal moult, which beginning at the usual

points removes the brown feathers of the preliminary dress, together with such barred feathers as may have been skipped by the incomplete postjuvénal moult. As a result of the last two moults birds become wholly white except for the black rectrices, males and females being indistinguishable. Numerous winter specimens illustrate this plumage. In some cases brown feathers may persist throughout the long Arctic winter, which furnishes a period of rest from November to May, much needed perhaps after the active feather production of the short summer. A few specimens show this (U. S. Nat. Mus. No. 19887, ♀, Great Slave Lake, April 4; No. 93060, ♀, Alaska, April 1, and No. 94409, ♂, Labrador, March 21); the last is an unusual case with much brown. As old and young in full white plumage are indistinguishable except that adult males appear to have the crown feathers basally black, it can only be said that this dress is worn without change until April, as shown by several specimens (U. S. Nat. Mus. No. 50060, ♀, Nulato, Alaska, April 12; No. 31660, Ft. Anderson, Canada, March 17; No. 98033, Bergen, Norway, March 15; Amer. Mus. No. 26889, Norway, "end of March"), and others with no indication of prenuptial moult up to that date.

First Nuptial Plumage. — At the beginning of the brief summer which follows the long winter a partial prenuptial moult takes place, the extent of which appears to depend upon latitude, sex, and probably age. Part of the white body feathers are replaced by dusky or reddish ones, males assuming chiefly those of the type shown by Plate I, Figs. 5 and 6, the color being dull black barred or mottled with buff; females, those of the same type but more boldly barred with a richer buff, as shown by Figs. 7, 8 and 9. Females may now be distinguished with certainty from males for the first time by plumage characters, the barring being coarser and extending to the head, throat and breast, the feathers of which in the male are reddish brown, chiefly with narrow dusky terminal bands, and often tipped, on the chin especially, with white. It should be observed that parti-colored feathers basally or terminally white may be assumed at this moult on the internal borders of the sternal bands just as in juvenal dress, the abdominal wedge, flanks, legs and feet, retaining as a rule the white feathers of the winter plumage. The

white remiges and their coverts are always retained and often much of the rest of the wing plumage, the median rows of coverts being the ones renewed if any are. The tail-coverts may be renewed, but the fourteen black rectrices remain. More than fifty specimens, chiefly in the U. S. Nat. Mus., illustrate the acquisition of this plumage, by growth of new feathers, during April, May and June, some still sprouting in July even when those of the next stage have begun to appear. It is not easy to tell old birds from young. The early appearance of new feathers is shown by the following specimens: U. S. Nat. Mus. No. 98034, ♂, Norway, March 15; No. 93059, ♂, Alaska, April 11; No. 73217, ♂, May 1, Alaska; No. 93146, ♂, Alaska, May 21; No. 46082, ♀, Alaska, May 9, and others too numerous to mention. There are many June birds and of these may be mentioned two specimens (Amer. Mus. No. 26174, ♂, Labrador, June 2, and No. 26170, ♀, Labrador, June 8) which from their plumage appear to be year old birds and are still acquiring new feathers at a number of points although fairly clothed above with the nuptial dress, which has extended to the inner members of the remiges and the median coverts.

Second or Adult Winter Plumage (preliminary). — Even before the nuptial dress is fully acquired the postnuptial moult sets in, beginning a little prior to the postjuvenile and resulting in an intermediate plumage partly white and partly reddish brown which may hardly be told from that of young birds at the same season. It should be observed that the moult of the remiges now includes the two distal primaries which are retained in young birds. Adults, however, seem to be somewhat grayer with finer mottling or vermiculation upon feathers of the type shown by Plate I, Figs. 2, 3 and 10, those of the throat being of a deeper red-brown with less barring than those of young birds. Practically young and old, both males and females, are all indistinguishable except by inconstant differences when clothed by the preliminary winter dress, but their age and sex may usually be told by the left over tell-tale feathers of an earlier plumage. Several Labrador birds (Amer. Mus. No. 26167, ♂, July 15, No. 26168, ♂, July 22, No. 26171, ♀, July 14, and No. 26172, ♀, July 15) show the postnuptial moult beginning early in July, as

they have already assumed several new, partly grown inner primaries and a very few of the reddish brown body feathers. An Alaskan specimen (L. B. Bishop, No. 4501, ♀, August 28) has renewed eight of the ten primaries, the two outer ones being worn and dirty white by comparison, and part of the other remiges and the wing-coverts except the median rows. New reddish mottled feathers have grown, scattered on the back rump and among the upper tail-coverts; and reddish feathers basally white, varying with their location, have largely replaced the nuptial ones on the chin, throat, breast and sides. The growth of white feathers is well under way on the abdomen, flanks, legs and feet, and the later strips of supplemental white on the sternal bands have even begun to appear producing shortly, as in the young bird, the effect of a central band of white with two lateral bands. The outer feathers of the sternal bands are the last to be renewed, a condition found on a female (L. B. Bishop, No. 4598, Alaska, Sept. 11) with the first and second primaries not fully grown, and the rectrices not yet reaching beyond the coverts. The abdomen, flanks, legs and feet are white, as well as most of the sternal bands, and the white is extending to the breast, white feathers just expanding being found at the customary points on various areas. The head and throat are chiefly reddish mixed with barred nuptial feathers, which also persist to some extent upon the back where white feathers of the supplementary stage are beginning to show. A similar male (Amer. Mus. No. 26162, Labrador, Sept. 26) shows a greater number of white feathers of the supplementary winter dress, and the primaries are full* grown. Two specimens of *alleni* (Amer. Mus. No. 25857, ♂, and No. 25858, ♀, Newfoundland, Sept. 15) also illustrate the preliminary winter plumage, having acquired a larger number of the reddish feathers than will be found on more northern birds, of which I have examined a large number from Labrador and Alaska. These birds, taken in various stages of plumage during July, August and September, illustrate the serial growth of feathers and the final acquisition of the pure white winter dress.

Second or Adult Winter Plumage (supplementary), acquired by a partial supplementary postnuptial moult, the beginnings of which

have been shown by the specimens described. Adults become wholly white, the females indistinguishable from young birds, but males apparently assume crown feathers which are basally black, gray prevailing in young birds. An Alaska specimen (Amer. Mus. No. 26180, ♂, October), indicates that the white dress may be acquired before November in that latitude; and this bird as well as others (*e. g.*, Amer. Mus. No. 26165, ♂, Labrador, December 20) show that basally black crown feathers grow in the autumn and are not white ones recolored in the spring.

Second or Adult Nuptial Plumage.—This is acquired, as in the young bird, by a partial prenuptial moult, doubtless extremely limited in high latitudes. The colors of adults are somewhat richer with a tendency to less barring and finer mottlings, at least in males. Two males (Amer. Mus. No. 49902, Great Slave Lake, Canada, June, and No. 26890, Archangel, Russia, May 5) illustrate new growth of feathers radiating from the usual points, the late renewal of the forehead and lores being excellently shown. The growth is confined wholly to the head, the rest of the bird being pure white. Numerous other specimens examined need not be here described, although illustrating the varying extent of the prenuptial renewal.

Later plumages and moults are but repetitions of those already fully explained in all details.

The wear of feathers in the Ptarmigans throws some light upon questions of plumage but they do not appear to suffer much from it and the rapid succession of the summer moult prevents marked abrasion or fading in most cases. As for the moult of the claws described by several observers, I need not discuss it in the present connection.

That the plumages are complicated and difficult to understand I am ready to admit, but I fail to find the slightest reason for supposing them to be produced otherwise than by moult. I may not have systematized the plumages or the moults in the best manner, but at least I have tried to bring out the facts in a way that I hope may clear up the misty ideas that have prevailed in spite of the plumages of the Ptarmigans having been the theme of so many writers.

Lagopus rupestris (*Gmel.*). ROCK PTARMIGAN.

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| " | " | reinhardi (<i>Brehm</i>). | REINHARDT'S PTARMIGAN. |
| " | " | nelsoni <i>Stejn.</i> | NELSON'S PTARMIGAN. |
| " | " | atkhensis (<i>Turner</i>). | TURNER'S PTARMIGAN. |
| " | " | townsendi <i>Elliot</i> . | TOWNSEND'S PTARMIGAN. |

The series of Rock Ptarmigans and near allies, though smaller and less complete than that of *lagopus*, shows conclusively that there is an analogous sequence of moults and plumages. The dusky buff-barred juvenal and nuptial stages of plumage are followed by an intermediate stage when mottled dusky gray feathers are assumed more or less abundantly on the upper parts of the head and the breast, while coincidentally the wings, abdomen, flanks, legs and feet assume a white plumage which is retained for a twelve-month. The dusky gray plumage, however, is scarcely donned before a supplementary moult begins, radiating from the usual points of departure on the sternal bands, and from the numerous other points on the back and head where other moults regularly begin. This supplementary moult advances down the middle of each sternal band or a little to its inner side, beginning on the sides of the breast and radiating laterally, so that the mesial borders of these feather tracts lose their parti-colored feathers earlier than do the borders beneath the wing. There is usually only a sprinkling of feathers of the intermediate stage on these tracts, together with *two sorts* of feathers that originated at the previous postnatal or postnuptial moults, according to the bird's age, all of which are now replaced by the growth of new white ones, as presently are all dusky feathers elsewhere. A pure white winter plumage with black tail results from *two* moults just as in *lagopus*. No evidence of color changing without moult is to be found. At the beginning of the short Arctic summer a prenuptial moult of varying extent takes place, apparently birds of localities where the snow is ever present undergoing a very limited renewal of grayish dusky feathers. I have discussed the corresponding changes of plumage so minutely under *lagopus*, that I need not repeat here except for clearness. The remarks apply to *rupestris* except when otherwise specified.

Natal Down.—It is difficult to distinguish the chicks from those of *lagopus*, but they are usually paler and grayer.

Juvenal Plumage, acquired by a complete postnatal moult. Much duskier, and more barred, with less rusty tinge than the same stage of *lagopus*. Two birds, apparently *reinhardi* (Amer. Mus. Nos. 64133 and 64134, Greenland, July 28), about one third grown, still retain natal down on the chin, throat, mid-abdomen, legs and feet, but have already acquired four partly developed white proximal primaries of the winter dress. The first and second juvenal primaries are white, partly grown, the rest dusky. The juvenal brownish tail is not fully grown.

First Winter Plumage (preliminary), acquired by a fairly complete postjuvenal moult excepting the first and second primaries. The wings (except the median coverts and inner remiges) become white together with the abdominal wedge of the ventral tract and all posterior to it including the flanks, legs and feet; while the head, throat, breast, sides and back become more or less dusky according to the extent of the renewal in different individuals and probably according to the latitude. These feathers are of the type shown by Plate I, Figs. 2, 3 and 10, but dusky instead of reddish as in *lagopus*. The black rectrices are acquired at the postjuvenal moult.

A number of specimens show the later stages of this plumage with the quickly ensuing change into the wholly white dress. It will suffice to cite a few. One (Amer. Mus. No. 67883, Sitka, Alaska, Sept. 15) has completed the postjuvenal moult of the wing except the third primary which is only half grown. The dusky preliminary dress prevails above and on the head and throat, with white feathers of the supplementary dress appearing on the throat, chin, back, tail-coverts and sternal bands, the last largely renewed by the supplementary moult which has not yet reached some parti-colored juvenal feathers at one border and both juvenal and preliminary winter ones at the other. The white of the mid-breast, abdomen, flanks, legs and feet is part of the preliminary dress. Another (Amer. Mus. No. 64130, ♂, Greenland, August 26) is more advanced, showing many white feathers of the supplementary stage. Other specimens (Amer. Mus. Nos. 66878, 66881, ♀, and 66882, ♀, Alaska, Sept. 15) are

simply a little further advanced with the lower parts almost entirely white and numerous patches of white on the head and back, the third primary by its immaturity marking them as young birds.

First Winter Plumage (supplementary), acquired as already indicated by a limited supplementary postjuvenal moult which removes all dusky retained juvenal and preliminary winter feathers. Both sexes become white with black tails and indistinguishable from *lagopus* except in some young males which have traces of the black lores peculiar to adults.

First Nuptial Plumage, acquired by a partial prenuptial moult, the extent of which seems to vary with latitude, sex and individual. Birds dwelling where snow prevails the whole year acquire but few dark feathers, as indicated by a couple of males (L. B. Bishop, No. 4182 and No. 4183, White Pass, British Columbia, June 11), the latter wholly in worn white winter dress save for a few partly grown dusky feathers on the crown, the former with a few on the crown and a similar small patch on the throat. It is not possible to say how far this moult will extend, but the lateness of the date precludes extensive renewal before the postnuptial moult begins. Other birds assume a grayish finely vermiculated or mottled dress, retaining only the white remiges and their coverts, the black rectrices, the white legs and feet and a variable number of white wing-coverts and white feathers of the mid-abdomen. Females would seem to undergo a more extensive renewal than males, being coarsely mottled and barred with buff and black, and now distinguishable for the first time from males by their plumage.

Second or Adult Winter Plumage (preliminary), acquired by a postnuptial moult, probably less complete in higher latitudes. The early beginning of this moult is shown by three worn females of *reinhardi* (Amer. Mus. Nos. 64128 and 64129, July 28, and No. 67820, July 25, Greenland) which have acquired a few new primaries and some dusky body feathers. Males and females are practically alike in this preliminary dress, and differ little from young birds.

Second or Adult Winter Plumage (supplementary), acquired by a partial supplementary postnuptial moult, birds becoming wholly white with black tails. Males, however, assume jet black lores

which distinguish them from young birds and from females. The coming of this dress is illustrated by several September birds (Amer. Mus. No. 67877, ♂, and No. 67880, ♀, Alaska, September 15) which have recently acquired new first and second primaries at the end of the postnuptial moult and are assuming many new white feathers about the head and on the back, by the supplementary moult.

Second or Adult Nuptial Plumage, acquired by a prenuptial moult, limited to the body plumage, as in the young bird.

Later plumages and moults are similar to those already described and occur in definite sequence.

Lagopus evermanni *Elliot*. EVERMANN'S PTARMIGAN.

“ **welchi** *Brewst.* WELCH'S PTARMIGAN.

“ **leucurus** *Swains. & Rich.* WHITE-TAILED PTARMIGAN.

I have seen too few specimens of these species to enable me to trace their sequence of plumages and moults, but those I have examined indicate the same changes as in *lagopus* or *rupes-tris*. *L. leucurus* becomes absolutely white in winter, the tail being white at all seasons except in the gray juvenal stage.

Tympanuchus americanus (*Reich.*). PRAIRIE HEN.

“ “ **attwateri** (*Bendire*). ATTWATER'S
PRAIRIE HEN.

“ **cupido** (*Linn.*). HEATH HEN.

“ **pallidicinctus** *Ridgw.* LESSER PRAIRIE HEN.

The usual sequence of moults and plumages prevails in this genus, the species of which need not be discussed separately.

Natal Down.—The bright tints of the lower parts of the chicks is characteristic, no other members of the Tetraonidæ approaching so nearly a canary yellow. Above they are mottled with rusty brown and dull black, spots of black also occurring on the nostrils, crown and behind the eyes. A chick of *americanus* (L. B. Bishop, No. 1968, North Dakota, June 12) shows the remiges and coverts partly grown, but the first and second primaries are not yet visible; elsewhere down prevails except a few juvenal feathers appearing in the humeral tracts. A chick of

attwateri (Amer. Mus. No. 59539, Texas, April 25) is similar but even younger.

Juvenal Plumage, acquired by a complete postnatal moult, which is overlapped by the postjuvenal moult before the birds are one half grown. This is illustrated by a young *americanus* (L. B. Bishop, No. 2070, North Dakota, July 5), which still retains natal down upon the head, throat, under surface of the wings, abdomen and legs. The first and second primaries are mere pin points, the third to eighth grown, the ninth a pin point and the tenth just expanding, the new ninth and tenth of course being part of the first winter plumage. The barred juvenal body plumage has been assumed elsewhere. Both males and females resemble adult females at this stage, being dusky above lined with white and barred with buff, the lower parts being dull white barred with dull black and buff, but neck tufts are lacking.

First Winter Plumage, acquired by a complete postjuvenal moult excepting the two distal primaries. Young and old become practically indistinguishable. A specimen of *cupido* (J. Dwight, Jr., No. 4370, ♀, Martha's Vineyard, Mass., Sept. 29) is almost wholly in this dress, new feathers however still expanding upon the chin and throat while the third primary is only half grown. The rest of the remiges except some inner members of the series show few signs of immaturity.

First Nuptial Plumage, acquired by a partial prenuptial moult, confined to the chin and head. A specimen of *attwateri* (Amer. Mus. No. 59538, Texas, April 25) shows a few new feathers growing among the old on the sides of the head.

Second or Adult Winter Plumage, acquired by a complete post-nuptial moult.

Later plumages are repetitions of summer and winter dress.

Pediœcetes phasianellus (Linn.). SHARP-TAILED GROUSE.

“ “ **columbianus** (Ord). COLUMBIAN
SHARP-TAILED GROUSE.

“ “ **campestris** Ridgw. PRAIRIE SHARP-
TAILED GROUSE.

The material is limited, but it shows that the birds of this genus evidently moult like the other Grouse.

Natal Down.—Not seen.

Juvenal Plumage, acquired by a complete postnatal moult. Similar to adult female but grayer and the throat white instead of buff.

First Winter Plumage, acquired by a complete postjuvenal moult excepting the two distal primaries. Several specimens have doffed most of their juvenal dress, the last of it persisting about the chin and neck. One bird (Amer. Mus. No. 47297, British Columbia, August 25) retains only the third and fourth primaries and some inner secondaries; the first and second of the series as usual only partly grown.

First Nuptial Plumage, assumed probably by a limited prenuptial moult, but not shown by the series examined.

Second or Adult Winter Plumage, acquired by a complete postnuptial moult. Several British Columbia specimens, taken in August, show actual moult at various stages.

Later plumages and moults are repetitions of earlier ones.

***Centrocerus urophasianus* (Bonap).** SAGE GROUSE.

The specimens examined were all taken in Wyoming in August, September and October and show the same stages of plumage as in the other Grouse. A young bird (Am. Mus. No. 64006, Wyoming, Aug. 15) is partly in juvenal dress, the first and second primaries not grown and the others already renewed by those of the winter dress except the third and fourth. An adult male (Amer. Mus. No. 64012, Wyoming, Aug. 25) has assumed new primaries excepting the distal two which are old and worn, the body plumage is partly renewed. An adult ♀ (Am. Mus. No. 64005, Wyoming, Aug. 15) has the four distal primaries old, the others new. The usual sequence of plumages and of moults undoubtedly takes place.

In conclusion I would say that as the subject of moult is to many a sealed book, I have gone into details and repetitions that may appear tedious, chiefly for the purpose of emphasizing the fact that moult is systematic no matter how varied the resulting plumage may be. Once let this idea be grasped and the most complex problems of plumage may be readily solved without recourse to theoretical explanations.

EXPLANATION OF PLATE IV.

All of these feathers are from the humeral tracts of specimens of *Lagopus lagopus*.

- Fig. 1. Juvenal Plumage (Amer. Mus. No. 26169, ♀, Sept. 5).
 " 2. Preliminary first Winter Plumage (from same specimen as Fig. 1).
 " 3. Preliminary first Winter Plumage (Amer. Mus. No. 45195, no data).
 " 4 and 11. Supplementary first Winter Plumage (Amer. Mus. No. 26889, ♀, March, and Amer. Mus. No. 26162, ♂, Sept. 26).
 " 5. First Nuptial Plumage (Amer. Mus. No. 26168, ♂, July 22).
 " 6. " " " (" " " 26174, ♂, June 8).
 " 7 and 8. First Nuptial Plumage (Amer. Mus. No. 26172, ♀, July 15).
 " 9. First Nuptial Plumage (Amer. Mus. No. 26170, ♀, June 8).
 " 10. Preliminary second Winter Plumage (from same specimen as Fig. 6).

EXPLANATION OF PLATE V (PHOTOMICROGRAPHS).

- Fig. 1. Neossoptile of Natal Down attached to tip of Juvenal Plumage feather (Amer. Mus. No. 26179, June 29, "12 days old") from humeral tract of *Lagopus lagopus*. (×20.)
 " 2. Neossoptile of Natal Down (J. Dwight, Jr., No. 2044, ♀, October 5) from chin of *Colinus virginianus*. (×20.)

FURTHER NOTES ON LACÉPÈDE'S 'TABLEAUX.'

BY CHARLES W. RICHMOND.

IN PRESENTING some notes on the date of publication of the above paper in 'The Auk' (Oct. 1899, 325), I stated that Lacépède's bird genera, as well as several credited to Cuvier, should be properly quoted as "Lacépède, in Daudin, *Traité*," etc., instead of "Mém. de l'Inst. III, 1801," assuming that a certain preliminary paper (in quarto), containing these genera and supposed to have been published in 1799, could not be found. In this I was mistaken, for before the appearance of the October 'Auk' I received a letter from Mr. Sherborn announcing the discovery of a copy of this rare tract, which has recently formed the basis of a second communication to 'Natural Science' (Sherborn, *Nat. Sci.*, Dec., 1899, 406-409).

The full title of this tract, quoting from Mr. Sherborn's account, is

"Discours | d'ouverture et de clôture | du cours | d'histoire naturelle | Donné dans le Muséum national d'Histoire naturelle, | l'an vii de la République, | et | Tableaux méthodiques | des mammifères et des oiseaux, | par le C^{en} Lacépède, | De l'Institut national de France [seven lines of titles, etc.] | a Paris | chez Plassan, Imprimeur—L'ibraire. | L'an vii de la République. |."

These 'Discours' occupy 56 pp., followed by 18 pp. of mammifères and 20 pp. of oiseaux, the subheading for the latter being "Tableau des sous-classes, divisions, sous-divisions, ordres et genres des oiseaux."

Mr. Sherborn gives the date of this tract as late in 1799, a detailed review being given in the 'Journ. général de la Litt. de la France for Nivôse, An. VII. (Dec. 21, 1799, to Jan. 19, 1800). There is, however, no reference to it in the 'Journ. Typographique,' although Daudin's 'Traité,' Vol. I, is duly announced on 30th Nivôse (Jan. 19, 1800).

While the 'Discours' and the 'Traité' doubtless appeared within a few weeks of one another, and the contents of the bird 'tableau' is practically identical in each case, the former has a slight priority and should be quoted, notwithstanding its inaccessibility to the majority of ornithologists.

In November last, while looking over some books in the library of the Academy of Natural Sciences in Philadelphia, I found an incomplete copy (the bird matter only) of Lacépède's paper in a volume of tracts.

A perusal of this copy shows the following list of genera to be credited to Lacépède, with page references:

Touraco, p. 2.

Astur, p. 4.

Nisus, p. 4.

Buteo, p. 4.

Circus, p. 4.

Milvus, p. 4.

Tyrannus, p. 5.

Muscivora, p. 5.

Myrmecophaga, p. 6.

Cacicus, p. 6.

Picoides, p. 7.

Orthorhyncus, p. 9.

Ceyx, p. 10.

Tridactylus, p. 11.

Gouan, p. 12.

Pelecanoïdes, p. 13.

Prion, p. 14.

Urinator, p. 14.

Carbo, p. 15.

Hians, p. 17.

Ibis, p. 18.

Macrotarsus, p. 18.

Hydrogallina, p. 19.

Touyou, p. 20.

GENERAL NOTES.

Notes on the Genus *Micruria*.—In the 'Catalogue of Birds in the British Museum' (Vol. XXVI, p. 595) W. R. Ogilvie-Grant suggests that *Micruria craveri* may possibly be the breeding plumage of *M. hypoleuca*. That such is *not* the case I have abundant evidence in some fifty or more *hypoleuca* of both sexes which I have taken from the nest, all of which were perfectly characteristic in having pure white under wing-coverts. I have taken *hypoleuca* in every month in the year and have never yet seen an adult with gray or dusky under wing-coverts. On many of the islands off the coast of Lower California *M. hypoleuca* begins nesting in late January, though I have found fresh eggs as late as early April. Late in February they may be seen at sea in family parties consisting of the parents and one or two downy young, which are taken to the water the first night, I think, after they are hatched. The young stay in company with the adults until late in the year, and after June 1 I have never seen an immature bird that could be identified as such at gunshot range. During the second week in June, 1897, I fell in with a number of family parties of *Micruria* off Magdalena Bay, Lower California. An immature bird was shot and upon securing it I found the under wing-coverts smoky gray more or less tipped with white, though I *thought* I was sure that the parents were typical *hypoleuca*. In March, 1899, I was so fortunate as to find several nests of young only just from the egg; two of these are before me, and as regards color, they are exact counterparts of the adults, except that the wings are *sooty below* as well as above. The parents in this case were secured and identified beyond a doubt. Thinking that I had at last a clew to the status of *M. craveri*—a species I had begun to consider somewhat mythical—I sent my Magdalena Bay specimen to Mr. Ridgway for comparison with specimens of *craveri* in the National Museum. His reply is to the effect that the National Museum has but three specimens of *craveri* and the same number of *hypoleuca*; the former "are evidently old birds, being in worn plumage; one of them has nearly completed the moult and still has the dusky wing-coverts!"

Mr. Ridgway suggests that the plumages may possibly represent the two sexes, the sexing of the specimens in the National Museum supporting that supposition, the "*craveri*" being marked males and "*hypoleuca*" as females; or that they may be individual phases of one species. As for the first suggestion, I can say that my series does not bear out the theory, there being, so far as I can see, no tangible difference in the plumage of the sexes. As for the theory of individual variation, if that be the solution, "*craveri*" must be very rare indeed in the northern part of the habitat of the genus. I have taken possibly 75 specimens between the Santa Barbara Islands and Magdalena Bay, and seen a great many more. The only one I have ever taken that suggested in any way the plumage

known as *craveri* is the immature specimen above mentioned. In the light of the present material it would be unsafe to consider *craveri* as a synonym of *hypoleuca*, though it is possible that it may prove to be a plumage of the young carried through one or more moults.—A. W. ANTHONY, *Taylorsville, Cal.*

Some notes on the Herring Gull (*Larus argentatus*).—The evidence that there is no such bird as *Larus argentatus smithsonianus* continues to accumulate. Doubts of the validity of this subspecies have been expressed before, both orally and in print. (Cf. Knight, Hist. of Birds of Me., p. 19; Maine Sportsman, July, 1898, p. 13; Journal of the Me. Orn. Soc., Oct. 1899, p. 37). These records refer to the occurrence in Maine of specimens referable to *L. argentatus*, and finally question the existence of any subspecific differences between American and European specimens. While in Portland a short time ago I had occasion to visit the shop of a local taxidermist and noticed a large number of these birds which he had skinned for sale to milliners. After carefully examining fully 100 specimens, which had been shot in Portland Harbor and vicinity, I was delighted to find ten specimens which were, as regards the first primaries, typical examples of *L. argentatus*. Three of the birds had the first primary entirely white at the tip without any trace of a black bar or dot, and the others had the black bar only slightly indicated. Other specimens had the black bar more complete, and a perfect series of gradations could be found between adult birds with only white on the apical part of the first primary and birds having a black bar half an inch wide near its extremity. The non-existence of the so-called subspecies *L. a. smithsonianus* seems to be completely demonstrated. At the same time I had the opportunity of examining a large number of Kittiwake Gulls and found a greater variation in their primaries than in those of the Herring Gull. In both cases specimens examined for comparative purposes were adult birds.—ORA W. KNIGHT, *Bangor, Me.*

Ring-billed Gull in New Hampshire.—Thanksgiving Day, 1898, at Campton Village, N. H., I was invited to a country store to see a strange bird that had recently been made a captive. Upon examination it proved to be a Ring-billed Gull (*Larus delawarensis*)—evidently a young bird.

It had first been seen at Waterville, N. H., where it was shot through one wing and then captured.

Thanksgiving Day, 1899, while driving through West Campton, I was surprised to see a Gull chasing a large flock of hens. Upon inquiry I learned that this was the Gull previously seen that had now spent one year in captivity. Its plumage seemed in good condition and the bird apparently enjoyed good health.

So far as I can learn this is the first Ring-billed Gull to enter the New Hampshire bird list.—ELLEN E. WEBSTER, *Franklin Falls, N. H.*

The Cinnamon Teal in Louisiana. — There are three comparatively late records of the occurrence of the Cinnamon Teal (*Querquedula cyanoptera*) in the State of Louisiana; all of these are from the southeastern part of the State, though the bird might be reasonably expected to be much more frequent in the western parishes. The first record was of a pair taken in December, 1884, on the western shore of Lake Pontchartrain, close to New Orleans. They were collected by a professional hunter, at that time in the employ of Prof. G. E. Beyer, of Tulane University. These specimens were sent to the State University at Baton Rouge, and have since been lost sight of.

In December, 1893, Mr. A. Perilliat shot two females on Lake Cattawatchie, about fifteen miles from New Orleans. These were mounted by Prof. Beyer, and are now in Mr. Perilliat's possession.

The third record, of a single male, was obtained at St. Malo, on Lake Borgne, the first week in January, 1900. This specimen, a very dark one, shot by a hunter named Rafael Robin, passed into the hands of Mr. G. A. Nelson, and was donated by him to the Tulane University Museum. — ANDREW ALLISON, *Tulane University, New Orleans, La.*

An Interesting Hybrid. — An exceedingly interesting hybrid between a Mallard (*Anas boschas*) and Pin-tail (*Dafila acuta*) was shot near New Orleans on February 18, by a professional hunter. It was presented to the Museum of Tulane University, and is now mounted and incorporated into the ornithological collection.

The specimen is not only unique on account of the distribution of the external male characteristics of the two species of ducks, but also on account of the perfect development of the sexual organs themselves, which, especially at this time of the year, should hardly be expected in the normal male of any species of duck. The testes were exactly five-eighths of an inch in length, by three-sixteenths of an inch in diameter. Microscopic examination of both the testes as well as the seminal ducts revealed apparently normal and fecundising fluid.

The general outline of the bird itself is that of the male Pin-tail with the exception of the length and thickness of the neck, which is more like that of the Mallard.

The head in general is rather heavy and compact; in color it is a mixture of the violet iridescence of the Pin-tail with the green of the Mallard; the crown and bill, however, in color as well as shape, are strictly Pin-tail, as are the wings, on which the speculum is rather of a brighter green than is ordinarily found in that duck, and resembles more the speculum of the male Green-winged Teal.

The rest of the upper parts are those of the Pin-tail also, whereas the lower parts are those of the male Mallard. The distribution of colors on the neck, however, is not symmetrical, for the right side is Pin-tail, and the left exhibits the characteristic chestnut of the Mallard, extending from the chest up to the somewhat broader white ring.

The tail presents the most curious blending of the two species, the two middle curled tail-coverts of the male Mallard, while still curled, are enormously lengthened, and now resemble the two long middle tail feathers of the Pin-tail; the middle tail feathers themselves are nearly as long as in the latter duck, but the rest of the tail is really Mallard. The crissum, again, is Pin-tail, and the orange-red feet are, in shape and color, as in the Mallard.—GEO. E. BEYER, *Tulane University, New Orleans, La.*

The Roseate Spoonbill in Kansas.—A specimen of this Southern bird was captured by a party of gentlemen from Wichita who were fishing on the Walnut River near Douglas, Butler County, Kansas, in April, 1899. The specimen is in the collection of Mr. Gerald Volk, of Wichita. It has not previously been reported from Kansas.—D. E. LANTZ, *Chapman, Kan.*

Breeding of the Little Black Rail (*Porzana jamaicensis*) at Raleigh, North Carolina.—In view of Dr. Allen's account of this rare bird in the last number of 'The Auk' I was interested to see recently a set of eggs in the collection of Miss Jean Bell of Ridley Park, Pa., which seems not to be recorded. Inquiry as to the history of these eggs brought from the owner of the collection the following manuscript notes of Messrs. H. H. and C. S. Brimley, which I was urged to publish. In doing so I wish to express my obligations both to Miss Bell and to Messrs. Brimley, to whom of course all credit belongs, my idea in publishing being merely to add to our knowledge of the bird in question.

"The Little Black Rail nests regularly here [Raleigh, N. C.] in the wet meadows lying along Walnut Creek, choosing for that purpose only those portions of the meadows covered with long grass, and building its nest in such situations in a grass tussock, either where the water actually stands among the grass or close to such a situation. The nests have never been found among cat-tails or bull-rushes or in the dryer portions of the meadows. The nests are found by the farm hands when cutting grass in the meadow, the nest being usually cut into and the eggs more or less injured before the cutter sees the nest. One such nest we found ourselves, all the others have been found and the eggs brought to us by farm hands. The following is a list of sets found at Raleigh:

"1. May 26, 1890. Five eggs in the nest and three of them broken; eggs fresh, nest of grass.

"2. June 8, 1892. Eight eggs, one destroyed; incubation advanced.

"3. June 16, 1892. Seven eggs, one broken; incubation about half completed.

"4. June 3, 1893. Eight eggs, two destroyed; incubation half completed. Nest cup-shaped, of dead cat-tail leaves and coarse grass.

"5. June 28, 1894. Eight eggs, one destroyed; fresh.

"6. July 12, 1894. Seven eggs; incubation advanced. Nest in tussock of coarse grass, made of dead grass and bull-rush leaves.

"7. August, 10, 1898. Six eggs; small embryos."—H. H. & C. S. Brimley.—WITMER STONE, *Academy of Natural Sciences, Philadelphia, Pa.*

Breeding of the Little Black Rail (*Porzana jamaicensis*) in New Jersey in 1844 and 1845.—Soon after the above note was written, by a curious coincident I came across a definite account of the breeding of this bird in New Jersey. Apart from a bare statement of the fact in Turnbull's 'Birds of East Pennsylvania and New Jersey,' the record seems not to have been published.

The facts are contained in letters written by Chas. C. Ashmead of Philadelphia to Prof. Baird, and for the privilege of publishing them I am indebted to Miss Lucy H. Baird. The extracts relative to the Black Rail are as follows:

July 28, 1844.—"My brother-in-law has just arrived from the seashore. Not long since he found a nest of the Black Rail; it was on a *fresh* water meadow near the seaside, and contained four eggs. He also caught the bird."

Oct. 2, 1844.—"I have the eggs of the Black Rail, also the full-plumaged male bird, in my possession."

Nov. 17, 1845.—"Tom Beesley has found another nest of the Black Rail, making the third he has found. The two first nests he found, one early in June, 1844, with four eggs; one early in June, 1845, with three eggs; and the last one about the middle of August, with but one egg in the nest. He had killed the bird before he found the nest. All three of the nests were found on the same spot of ground,—a fresh marsh on the banks of the Great Egg Harbor River, and not more than one fourth as big as the College Campus [at Carlisle]."

The locality was evidently Beesley's Point, and a brief mention of the spotting on the bird leaves no doubt of its identity. The fact, however, that Mr. Ashmead and his brother were constantly at the Academy at this time, and in daily association with Mr. Cassin, would preclude the possibility of any error in identification. The discovery that this obscure little bird still breeds in this locality is well within the limits of possibility.—WITMER STONE, *Academy of Natural Sciences, Philadelphia, Pa.*

Occurrence of *Tringa fuscicollis* in Virginia in Autumn.—During a visit to the Eastern Shore of Virginia in company with Dr. William C. Rives, Sept. 21–28, 1899, a specimen of the White-rumped Sandpiper was secured near Chincoteague, Va., on the sand flats lying inside the beach of Assateague Island on Sept. 24. The bird was shot as it flew past with a flock of Semipalmated Sandpipers, among which it was conspicuous by reason of its larger size. It was the only individual of this species observed on the trip. This species appears in Dr. Rives's 'Birds of the

Virginias' in the hypothetical list. It was definitely recorded from Smith's Island, Northampton County, by Mr. Edw. J. Brown, who secured three specimens between May 14 and 28, 1894.

The present note is, we believe, the first definitely recorded instance of the species for Virginia in autumn. The specimen secured is a female. — WILLIAM C. BRAISLIN, M. D., *Brooklyn, N. Y.*

A Further Note on the Specific Name of *Falco regulus*. — Since the tentative proposal to change the specific designation of this species (Auk, April, 1899, p. 182), both the references to supposed earlier names have been verified and their status determined. One of these names, *Accipiter merillus* Gerini (Orn. Meth. Dig. 1767, I, 51, pll. xviii, xix) is, under present rules, untenable, for Gerini is clearly not a binomialist, as is disclosed by even a casual examination of his volumes. Since the other name, *Falco æsalon* Tunstall (Orn. Brit., 1771, p. 1), proves to be a nomen nudum, the Merlin apparently must continue to stand as *Falco regulus*. — HARRY C. OBERHOLSER, *Washington, D. C.*

The Arctic Three-toed Woodpecker in Beverly, Mass. — On January 21, 1899, I observed a pair (male and female) of the Arctic Three-toed Woodpecker (*Picoides americanus*) in the white-pine clumps of Beverly Commons; the female busily chiselling for grubs in a fallen trunk. She seemed wary, but hungry enough to allow of approach within twelve or fifteen feet, and continuous observation for ten minutes. With a good field-glass I could trace the passage of the grub when gulped down her gullet. She chiselled with great rapidity and skill, making the chips fly vigorously. The male meanwhile was perfectly quiet on a neighboring living trunk; so that his presence was unsuspected till the female, finally scared, flew to his tree and disturbed him into motion. Both then bounded off through the air with whirr of wings, the female leading. This record must be pretty far south for this species, especially in such a mild and open winter. Both birds were sleek and plump. — REGINALD C. ROBBINS, *Boston, Mass.*

The earliest name for the Roadrunner. — A recent note on the early history of the Roadrunner (Auk, Jan. 1900, 66) by the late Dr. Coues, suggests a point bearing on the proper name for the species. It is more than probable that Lesson's term *californiana* (1829) should be replaced by *longicauda* of Swainson (1824), but this is a matter which cannot at present be satisfactorily determined. On reference to Swainson's 'Classification of Birds,' II, 1837, 325, it will be noted that he quotes "*L. longicauda* Sw. (1824)" under the genus *Leptostoma*. Now, the name *longicauda*, for this Cuckoo does not occur in any accessible work of Swainson's of the year 1824, but it will almost certainly be found in his 'Appendix' to Bullock's Catalogue of his [Bullock's] Mexican Museum, published in that year. This work is so scarce that, apparently, no copy is now accessible to orni-

thologists. In addition to the Roadrunner it is probable that many of the species now credited to the Phil. Mag. 1827, were first described here.

Swainson's 'Appendix' ought to be as worthy of recognition as A. A. H. Lichtenstein's 'Catalogus Rerum' (1793), or Leach's 'Systematic Catalogue' (1816), or H. Lichtenstein's 'Preis-Verzeichniss' (1830), and should a copy come to light it is to be hoped that, like the works just mentioned, it may be reprinted for the benefit of ornithologists. — CHARLES W. RICHMOND, *Washington, D. C.*

The Red-headed and Other Woodpeckers in Michigan in Winter. — On reading the note in 'The Auk' for January, 1900, page 67, entitled 'The Red-headed Woodpecker near Chicago, Ill.,' by G. S. Mead, of San Francisco, Cal., I wish to say that the presence of the Red-headed Woodpecker (*Melanerpes erythrocephalus*) during the winter months in Michigan does not depend upon the temperature, but entirely upon the food supply, viz.: the crop of acorns and beechnuts which precedes the winter. If these nuts are plenty, the Red-headed Woodpecker will always be found during the winter months, but in no great abundance. If there are no acorns or beechnuts, this bird will be entirely absent in our Michigan forests. The Red-headed Woodpecker is therefore one of those peculiar birds whose migrations depend upon circumstances, viz.: the abundance of proper food; and this will be found characteristic of some of the rest of the family (Picidæ), namely, the Red-bellied (*Melanerpes carolinus*) and the Golden-winged Woodpecker (*Colaptes auratus*), which are sometimes found with us during the whole year, and sometimes they are absent during the winter months. The only bird of this family which I have *not* observed during the winter months is the Yellow-bellied Woodpecker (*Sphyrapicus varius*), which subsists almost entirely upon the sap and inner bark of trees, preferably the hard maples and the Austrian and Scotch Pines, which are usually found planted in lawns and parks. The Yellow-bellied Woodpecker makes his appearance in Michigan about the first of April when the sap is in full flow, and you will always find him on the park or lawn doing great damage among the Austrian and Scotch pines, in some cases entirely girdling and ruining the trees. This is the only member of this family that should *not* be protected by law. — JAMES B. PURDY, *Plymouth, Wayne Co., Michigan.*

The Flicker Wintering in Montreal. — On January 14, 1900, while walking with a friend along the woods at the foot of Mount Royal, I was surprised to see a Golden-winged Woodpecker (*Colaptes auratus*) fly from a tree within a few feet of us; it alighted on a sumac near by and began to feed on the seeds. We had a good view of it for a short time, until it flew into some low bushes and disappeared.

We saw one near the top of Mount Royal on November 25, 1899, which was, perhaps, the same bird, this being an unusually late date for its occurrence. The winter here has been milder than usual, but I have

never heard before, even in mild seasons, of *C. auratus* wintering so far north. — J. B. WILLIAMS, *Montreal, Can.*

Chuck-will's-widow in Kansas. — Prof. D. E. Lantz kindly informs me that the specimen of the Chuck-will's-widow (*Antrostomus carolinensis*) taken at Wichita, Kan., as recorded by me in a footnote to p. 187 of 'The Auk' for April, 1889, is really the specimen recorded by him on the same page, which was sent to Prof. Dyche for confirmation of the identification, and by the latter forwarded to me. — J. A. ALLEN, *Am. Mus. Nat. History, New York City.*

Otocoris alpestris praticola at Ipswich, Mass. — On October 26, 1899, at Ipswich, Mass., with Dr. Walter Faxon and Mr. G. M. Allen, I took a male Prairie Horned Lark out of a flock of four birds (two others were also seen later), the other three appearing to be of the same race. The specimen taken seems of especial interest, as its measurements and paleness make it approach very nearly to *arenicola*, — the specimen being almost intermediate as it is. Mr. Harry C. Oberholser and Mr. William Brewster, and all who have examined the bird, are of the opinion, however, that it is perhaps nearest *praticola*, and must be called such. Geographically of course, the bird is *praticola*, for if *arenicola* it is a straggler far out of its usual range. — REGINALD HEBER HOWE, JR., *Longwood, Mass.*

The Red Crossbill Unusually Common at Portland, Maine, in Summer. — During the early summer of 1899, Red Crossbills (*Loxia curvirostra minor*) were numerous about the west end of Portland, Maine, — a section of the city in which there is still a good deal of land devoted to gardens and lawns, and which contains a hill-side park with a large grove of pines. I returned to Portland from the south on June 2. The birds were then everywhere in evidence about my neighborhood, but mainly because of their vociferousness. They were quite elusive, and I found it difficult to estimate their numbers except from the noise they made. It was not until July 1 that I saw a large number together. On that morning, I counted twenty-eight in one open flock which flew slowly over me as I stood in the middle of a wide lawn. On the afternoon of that same day I left Portland for the summer. — NATHAN CLIFFORD BROWN, *Portland, Me.*

White-winged Crossbills in Rhode Island. — It may be of interest to Rhode Island ornithologists to record the taking of White-winged Crossbills (*Loxia leucoptera*) at Neutaconkanut Hill, Johnston, R. I., Jan. 14 and 30, and at Pawtuxet on the 1st, 2d and 24th of February. — EDWARD H. ARMSTRONG, *Providence, R. I.*

White-winged Crossbills and Brünnich's Murres in Central New Hamp-

shire.—Central New Hampshire has recently been visited by some rare birds for the locality. White-winged Crossbills (*Loxia leucoptera*) have previously been watched for in vain for thirty years by one of our best bird students, but he found them in comparative abundance this year and they have been seen by many other observers. Doubtless there have been stray individuals of this species here before, but their numbers at this time are particularly worthy of note.

A stranger visitation, however, has been a flock of Arctic sea birds. The last of November, 1899, a friend brought me a bird for identification that had been caught alive on land several miles from water, but it lived only a few days in captivity. I found it to be a Brünnich's Murre (*Uria lomvia*). Soon I learned that three others had been shot on one of the bays of Lake Winnepesaukee. The finest specimen was mounted, but the other two were used for the purpose of testing Gen. Greeley's statement that their flesh was excellent—the best flavored of any of the Arctic sea fowl. The report of the New Hampshire sportsmen was that roasted Murre tasted about as much like fowl as a smoked herring tastes like fish.

Still another Brünnich's Murre was seen to fly into a brush heap at Franklin Falls, where it was easily captured, uninjured. The captors, supposing they had a young Loon, took the bird to Webster Lake, three or four miles away, and, tying a string to the bird's leg, they hoped to observe some interesting feats in diving. In this they were disappointed, but the bird *swam* so vigorously that the string was broken and the bird's liberty was almost gained when, I am sorry to add, a shot from a gun ended its career.

Several other Brünnich's Murres have been reported and, so far as I can learn, it is the first time they have been taken here.

It has been said that if, by mischance, this bird should alight on land, it cannot always rise on wing to make its way by flight back to water. Is this statement correct?—ELLEN E. WEBSTER, *Franklin Falls, N. H.*

Ontario Bird Notes.—*Gavia arctica*. BLACK-THROATED LOON.—A female was taken on May 22, 1899, off Mimico (a suburb of Toronto), in Lake Ontario. The bird is in immature plumage, slightly abraded; the only previous record for Toronto is that of a pair sent to the Paris Exhibition of 1867.

Phalacrocorax carbo. CORMORANT.—A male was taken in Ashbridge's Bay, Toronto, on November 21, 1896. The bird was evidently starving and in a very bedraggled condition; it was killed with a brick by some boys. The Double-crested Cormorant is a regular migrant but this is the first true Cormorant I have seen from Toronto.

Histrionicus histrionicus. HARLEQUIN DUCK.—A female was taken at the Eastern Sandbar, Toronto, on October 20, 1894. The Harlequin Duck can be regarded as only a straggler on Lake Ontario. I have the records of three more specimens taken here in recent years; two immature males and a mature female.

Rissa tridactyla. KITTIWAKE.—Several were taken about Toronto in November, 1899.

Strix pratincola. AMERICAN BARN OWL.—A specimen was captured alive on a coal dock near the bay-front, Toronto, on September 7, 1899. The bird died soon afterwards and proved to be a male. This is the only Toronto record I am aware of, certainly the only one in recent years.

Pelecanus erythrorhynchus. AMERICAN WHITE PELICAN.—A male was shot on May 27, 1899, in the western bend of Lake Nipissing, Ontario.—JAMES H. FLEMING, *Toronto, Can.*

New Brunswick Notes.—It is evidently news to ornithologists that the American Robin (*Merula migratoria*) should be a winter resident in New Brunswick, yet such is without a doubt true. A big-game hunter informed me that about a large spring near the headwaters of the Nepisiquit River Robins were seen about the 20th of December, 1898. In the latter part of March, 1899, this locality was again visited and the Robins were there to the number of about fifty.

The Robins leave this locality (Scotch Lake) late in October or early in November, returning generally in the first week of April, but sometimes in the latter part of March. This locality is situated about 46° N., quite a distance south of the Nepisiquit.

A Turkey Buzzard (*Cathartes aura*) was captured in March, 1898, in Victoria County, N. B., and another seen at Keswick, York County, N. B., the same spring.

A Mourning Dove (*Zenaidura macroura*), a very rare bird here, was taken near Fredericton, Oct. 14, 1899.—WILLIE H. MOORE, *Scotch Lake, York Co., N. B.*

Bird News from Central New York.—In the three years which have elapsed since my last communication to 'The Auk' I have been able to add three new species to our list of Oneida County Birds, which with *Icteria virens*, recorded by Mr. W. J. B. Williams on page 331 of Vol. XV, bring the total for our vicinity up to 247. These three are:

Numenius hudsonicus. HUDSONIAN CURLEW.—A specimen of this bird, sex unknown, was shot on Verona Beach, Oneida Lake, by Egbert Bagg, Jr., Sept. 5, 1899.

Strix pratincola. AMERICAN BARN OWL.—About the middle of September, 1898, Mr. Charles L. Smith of Utica was driving in the adjoining town of Marcy, when he saw an Owl in a tree beside the road. While he was watching the bird, it left its perch and flew to a neighboring barnyard where it proceeded to "chase the chickens." Mr. S. left his horse and went to the rescue of the chickens, expecting to see the Owl fly away, but instead, it sought safety under the barn (perhaps having been there before). Mr. S. crawled in after the bird and captured it alive and took it home with him. He kept it alive for some time but finally

had it killed, mounted and placed in the store window, where I saw it and obtained from Mr. Smith this account of its curious capture.

Wilsonia mitrata. HOODED WARBLER.—Mr. W. R. Maxon finds this species every summer on the west slope of the "Stockbridge Hills," a few miles from the village of Oneida. He has observed them during the breeding season for three years and on June 24, 1898, secured a fine male in full plumage.

In addition to these new records the following seem worthy of mention :

Charadrius squatarola. BLACK-BELLIED PLOVER.—Between September 5 and 7, 1899, Egbert Bagg, Jr., and a companion killed several birds of this species on Verona Beach, Oneida Lake. Our second record.

Ardetta exilis. LEAST BITTERN.—I killed a young bird at Verona Beach, Sept. 1, 1898, and another was killed in the same town in the fall of 1897. Additional records. This bird may safely be put down as not uncommon near the western border of the county.

Tringa bairdii. BAIRD'S SANDPIPER.—A young bird was shot on Verona Beach by Egbert Bagg, Jr., Sept. 4, 1897, and a second specimen at the same place Sept. 5, 1899. Our only previous knowledge was Mr. Henshaw's record at Locust Grove in 'The Auk,' Vol. II, page 384.

Colinus virginianus. BOB-WHITE.—Mr. W. R. Maxon writes me, "On June 11, 1897, a covey of young Quail, able only to run, was observed near Sherrill, Oneida Co. A few Quail remained all last summer (1897) in the neighborhood of the Oneida County house, where they were observed frequently by Mr. Percy Klock. Additional records.

Accipiter atricapillus. AMERICAN GOSHAWK.—This bird is not uncommon in Hamilton County, where I have observed it for several years during the month of May, and where I had the pleasure of taking a nest on May 9, 1898. This is our first breeding record.

Ammodramus savannarum passerinus. GRASSHOPPER SPARROW.—Mr. W. R. Maxon finds this bird common in the hills south of Oneida. He has taken several specimens in successive summers. Additional records.

Pipilo erythrophthalmus. TOWHEE.—A pair was taken in the town of Vienna, about two miles northeast of the village of North Bay, July 8, 1897. Our fourth record, but all the others were migrants.

Dendroica cærulea. CERULEAN WARBLER.—June 24, 1898, Mr. Maxon found these birds to the number of 25 or more inhabiting a piece of woods about five miles south of Oneida. He secured three specimens. In June, 1899, he found them in the same place and took two more. We had one previous record from Clinton.

Harporhynchus rufus. BROWN THRASHER.—July 8, 1897, I found these birds very common a few miles northeast of North Bay in the town of Vienna, evidently resident. Entered before as "occasional."—EGBERT BAGG. *Utica, N. Y.*

Some Necessary Changes in Nomenclature. — *Pan* (Richm. 1899, vice

Tetragonops, preoccupied) being preëmpted (Oken, Mamm. 1816), as I am informed by Dr. T. S. Palmer, the genus of Barbets formerly known as *Tetragonops* may be called *Semuornis*,¹ with *S. rhamphastinus* (Jard.) as the type. *Semuornis frantzii* (Scl.) of Costa Rica, is the only other species at present known.

Geothlypis velata (Vieill. 1807) should give way to *G. cucullata* (*Sylvia cucullata* Lath., Index Orn. II, 1790, 528) of earlier date. The Mexican species recently described by Salv. and Godm. (*Ibis*, 1889, 237) as *Geothlypis cucullata* thus requires a new name, and it is with pleasure that I propose that of *Geothlypis nelsoni*, after Mr. E. W. Nelson, who has so thoroughly explored Mexico in the past few years.

The Wryneck of South Africa, commonly called *Lynx pectoralis* Vigors (P. Z. S. Aug. 5, 1831, 93), should properly be known as *Lynx ruficollis* Wagler (Natiürl. Syst. Amphibien, 1830, 118, footnote).

Phyllostrephus terrestris Swains. (Birds of Western Africa, I, March, 1837, 270, footnote) is the correct name for the species now known as *P. capensis* (Swains. Classif. Birds, II, July, 1837, 229).

Melanobucca Shelley, 1889, should give way to *Lybius* Hermann, 1783 ('Tabula Affin. Anim.', 217, 235), with 'Le Guifso Balito' of Buffon (*Loxia tridactyla* Gmel.) as type. The species of this genus are: *Lybius bidentatus* (Shaw), *L. æquatorialis* (Shelley), *L. melanopterus* (Peters), *L. levaillantii* (Vieill.), *L. macclounii* (Shelley), *L. leucocephalus* (De Fil.), *L. albicauda* (Shelley), *L. abbotti* (Richm.), *L. senex* (Reichenow), *L. leucogaster* (Bocage), *L. tridactylus* (Gmel.), *L. torquatus* (Dumont), *L. torquatus conigicus* (Reichenow), *L. zombæ* (Shelley), *L. irroratus* (Cab.), *L. vieilloti* (Leach), and *L. undatus* (Rüppell).

Pithys Vieillot, 1823, for a genus of Ant Thrushes, is antedated by *Manikup* Desmarest (Hist. Nat. des Tangaras, text to pl. 66), 1805. The type is *Manikup albifrons* (Gmel.), with a subspecies *Manikup albifrons peruviana* (Tacz.).

Crypturus pileatus (Bodd. Dec. 1783, or later) is antedated (without doubt) by *Tinamus soui* Hermann, Tabula Affin. Anim., 1783, 164, 235, and the species will thus become *Crypturus soui* (Hermann). — CHARLES W. RICHMOND, Washington, D.C.

An Interesting Bit of Manuscript.—I have elsewhere explained how part of the edition of the Birds of the U. S. Exploring Expedition by Peale, was burned and that owing to the very small number of copies published, the volume became very scarce, especially in Europe where it was in great demand. The plates, which really did not appear until Cassin's edition of the Report came out, were supposed at the time to have been issued with Peale's volume.

In this connection the following inscription in Bonaparte's writing is of much interest. It is written on the cover of a copy of Bonaparte's 'Notes

¹Σεμνός, solemn; ορνίς, bird.

sur Les Larides' ext. de la Rev. et Mag. de Zool., 1854, which I picked up in an old book store in Philadelphia. "Titian Peale, Esq., Zoologist, etc., from his friend the author. How can I manage to get a copy of the Am. Expl. Exp. Zool. in exchange or sale? The Plates have not yet reached Europe." Below in Peale's hand is "Rec'd June 14, 55. T. R. P." —WITMER STONE, *Academy Natural Sciences, Philadelphia, Pa.*

RECENT LITERATURE.

Keeler's Bird Notes Afield.¹ — Mr. Keeler's charming book on California birds consists of a series of thirteen essays well entitled 'Bird Notes Afield,' with an Appendix (pp. 235-353) containing 'A Descriptive List of California Land Birds with Key.' The titles of the essays—'A First Glance at the Birds,' 'Patrolling the Beach,' 'A Trip to the Farallones,' 'A Day on the Bay Shore,' 'A Glimpse of Birds of Berkeley,' 'March in the Pine Woods,' 'Summer Birds of the Redwoods,' 'In a Mission Patio,' etc.—indicate very fairly what may be expected in 'Bird Notes Afield,' if we add that they are written by a sympathetic bird lover, who is withal an excellent field ornithologist, possessing the literary ability to tell gracefully and charmingly of the bird life of California fields, seashore and mountains. The first essay, 'A First Glance at the Birds' (pp. 1-52), is a general review of the birds of the State, which, as a brief popular account, is one of the best pieces of this kind of bird literature we have ever read. The style is attractive, and the narrative replete with the enthusiasm of a true bird-lover, who writes because he has something to say. The other essays are all in the same vein, and each by itself would be perhaps equally attractive, but as they were apparently written for special occasions and separate publication (several of them had appeared before and are here republished), there is naturally some repetition, as where the same species, appearing in several different essays, is repeatedly referred to in much the same language. But this is a slight fault, noticeable only on reading the book through consecutively.

The 'Artificial Key' to the California Land Birds is based primarily on color, the birds being divided into five primary groups on this basis. Each group is subdivided into sections, under which the species are arranged by their most striking features of difference, with a reference to the page where each is more fully described, in the systematic order of

¹ Bird Notes | Afield | A Series of Essays on | the Birds of California | By | Charles A. Keeler | — | D. P. Elder & Morgan Shepard | San Francisco | 1899. — 12mo. pp. i-viii + 1-353. \$1.50.

the A. O. U. Check-List. The number of species thus formally treated is 204. This is the first work of the kind on the birds of any part of the Pacific coast-region, and should be of great aid to "those who," as the author says, "wish to have an introduction to our familiar birds in their native haunts," for whom the book is especially intended. The omission of an Index, however, in a book of this character, is a grave fault, and a rare one, fortunately, in the bookmaking of to-day. — J. A. A.

Russell on Birds of the Northwest Territory. — Mr. Frank Russell's 'Explorations in the Far North'¹ contains a list of birds collected by him during two years spent in the Northwest Territory. The chief points at which collections of birds were made are Grand Rapids, on Lake Winnipeg, at the mouth of the Saskatchewan River, Aug. 30, 1892, to Feb. 20, 1893; Crow Nest Pass, Alberta, April, 1893; Fort Chippewyan, at the western end of Lake Athabasca, May 15 to June 15, 1893; Fort Rae, on the northern arm of Great Slave Lake, July, 1893, to May, 1894, and Herschel Island, on the Arctic Coast, July and August, 1894. Mr. Russell's adventurous journey was undertaken for the purpose of securing collections in all departments of natural history, including especially ethnology as well as zoölogy, ornithological work thus receiving only a portion of his attention. The list of birds, however, numbers 122 species, and adds much interesting information on the birds of the extensive regions visited by the author. Instead, however, of combining all of his observations into a single list, it would have been more convenient for the reader, seeking definite information regarding particular localities, if he had divided the list so as to give a separate enumeration of the species found at each locality. It would have made a little repetition as regards a few species, but the geographical clearness thus gained would have much more than compensated for a little loss of space.

We note that the list records the capture of two specimens of the European Widgeon (*Anas penelope*), — one at Grand Rapids, Lake Winnipeg, Sept. 1, and one at Fort Rae, Aug. 22, which, taken in connection with the small number of Ducks reported as taken, seems quite remarkable. As we also note that the list records the capture of two specimens of *Spizella pallida* at Fort Rae, and a specimen each of *Spizella socialis arizonæ* and *Sayornis phæbe* at Fort Chippewyan, while *Contopus richardsoni* is not mentioned, it is difficult to give quite as full confidence to the Widgeon records as would be otherwise natural. Also it is at least unexpected that his 52 specimens of Redpolls, taken at various points from Lake Winnipeg to Herschel Island, should all be referable to *Acanthis linaria*, this being also the only species of *Acanthis* given in the list. Both species of *Sco-*

¹ Explorations | in | the Far North | By | Frank Russell | — | Being the Report of an Expedition under the | Auspices of the University of Iowa | during the years 1892, '93, and '94 | — | Published by the University | 1898. — 8 vo. pp. i-ix, + 1-290, map, and numerous half-tone plates. Birds, pp. 253-270.

Iecophagus are given as "abundant" in May at Fort Chippewyan, and the White-crowned Sparrow, found at Fort Rae, is recorded as *Zonotrichia intermedia*. While some of these records are surprising, to say the least, and possibly, with some others not here mentioned, may require revision, great credit is due Mr. Russell for the successful accomplishment of a most difficult journey, often under circumstances requiring a high order of courage, determination, and intelligence, and the Iowa University is to be congratulated upon the very substantial returns, in the way of collections and information, that have resulted from the young explorer's efforts as its representative. — J. A. A.

Loomis on California Water Birds.—Part IV¹ of Mr. Loomis's notes on California Water Birds relates to observations made off the coast of Monterey, September 18 to November 14, 1896. For nearly two months almost daily trips were made upon the ocean from the Hopkins Seaside Laboratory at Pacific Grove, and a summary of each day's observations is given (pp. 278–303). Then follow his 'Conclusions,' and finally a formal list of the species observed. The 'Conclusions' relate to the subject of migration, and treat of 'Migration Southward after Breeding Season,' 'Guidance by Physical Phenomena,' 'Guidance by Old Birds,' and 'Cause of Migration.' Especial attention is called to the fact that certain species of Petrels and Shearwaters found in our northern waters in summer breed either in the southern hemisphere or in the tropics. Mr. Loomis, in view of his experiences with the water birds off the California coast, has reached the conclusion that they are guided in their movements by the shore line and its prominent landmarks, and that in their sea journeys they may be able to direct their course by the currents and winds, and possibly by "celestial phenomena." He also considers it "reasonable to conclude that the young in the journey from their birthplace to the winter home of the species are dependent upon the guidance of the old birds who know the way because they have traveled it." "The causes of migration" he considers to be (1) "physical or outward," and (2) "psychological or inward." "In fine, it is maintained that winter, past and present, with its failure of food is the outward cause of all migratory movement." The "psychological or inward" cause of migration resolves itself into 'Inheritance,' 'Education' and 'Habit.' "It is not unreasonable" he says, "to suppose that there exists in migratory birds an inherent desire for travel and an inherited talent for geography. The ease with which birds find their nests in chaparral or in a sea of tules manifests that they possess memory of direction and locality in a remarkable degree. In migratory

¹ California Water Birds. No. IV, Vicinity of Monterey in Autumn. By Leverett M. Loomis, Curator of the Department of Ornithology. Proc. California Acad. Sci., Third Series, Vol. II, No. 3, pp. 277–322, pl. xv (map). Issued Feb. 12, 1900.

birds this faculty may attain higher development, becoming a talent for geography. The restlessness sometimes displayed in seasons of migration by wild birds reared in captivity is perhaps indicative of an incentive to travel. But here heredity seems to end and *education* to begin, for there appears to be guidance by old birds and guidance by physical phenomena. . . . Intelligence and habit remain to account for the constancy of migratory birds to time and place. . . . In short, it is believed that the causes of migration are simple facts and not impenetrable mysteries lying beyond the domain of scientific enquiry. . . . To sum up the whole matter in a single sentence: It is held that bird migration is a habit evolved by education and inheritance which owe their origin and perpetuation to winter with its failure of food."

Doubtless few careful students of migration will disagree with Mr. Loomis in respect to the propositions above quoted, and very few of the points raised have the interest of novelty, they having been in the main stated before by Mr. Loomis, and independently by others. But he gives us very little satisfaction, and nothing new, on the subject of what prompts the return migration. What he has to say on this point (mainly in a footnote on p. 315) is a rather weak attempt at destructive criticism of the views held by others.

The annotated list (pp. 317-322) of birds observed off Monterey during the two months of observations forming the occasion of the present paper numbers 42, several of which, however, were seen but once or twice; the bulk of the birds met with were a few species of Gulls, Shearwaters, Ducks and Phalaropes. Among the Shearwaters, Buller's Shearwater (*Puffinus bulleri*) is recorded for the first time as a North American bird, on the basis of a specimen captured by Mr. Loomis off Point Pinos, Nov. 6, 1896. It is also the fourth specimen known to science, the others, including the type, having been taken in New Zealand waters. "It may be confidently expected," says Mr. Loomis, "that persistent observation off Monterey will add to the list of pelagic wanderers from austral regions."—J. A. A.

Stone on 'The Summer Molting Plumage of Certain Ducks.'¹—The collection of Arctic birds recently made at Point Barrow, Alaska, by Mr. E. A. McIlhenny, includes large series of various species of Eiders which have formed the basis of Mr. Stone's observations here detailed. Mr. Stone finds that there is a supplemental summer plumage, or post-nuptial dress, in not only the King Eider, the Pacific Eider, the Spectacled Eider, and Steller's Eider, but also in the Red-breasted Merganser. It has also been recorded as occurring in the Pintail and in various other species of Ducks in which the males and females are markedly different in coloration, and the inference is that this double summer moult is general among

¹The Summer Molting Plumage of Certain Ducks. By Witmer Stone. Proc. Acad. Nat. Sciences Phil., 1899, pp. 467-472. Separates issued Dec. 1, 1899.

the Ducks in which there is a marked sexual difference in plumage. This post-nuptial plumage "is mainly restricted to the head, neck, breast and scapulars," and is acquired just prior to the loss of the flight feathers at the regular annual post-breeding moult; it is of dull tints, and rather loose structure, and is worn for only a few weeks, or during the period when the birds are unable to fly, through the loss of the flight-feathers by moult. "At such a time," says Mr. Stone, "a dull blended plumage would naturally be important in rendering the bird inconspicuous and thereby protecting it, and such I think is the explanation of this curious molt." Mr. Stone has here for the first time clearly described this temporary post-nuptial plumage and suggested its rôle in the economy of the species. As will be noticed later (see p. 186) Mr. Chapman has, independently and almost simultaneously, described this plumage in the King Eider and the Greenland Eider.—J. A. A.

Stone on a New Race of Short-eared Owl.—Mr. Stone finds¹ that a series of Short-eared Owls from Point Barrow, Alaska, in Mr. McIlhenny's collection are much paler than birds from Pennsylvania, and on this basis he has named the Point Barrow birds *Asio accipitrinus mcilhennyi*.—J. A. A.

Bangs on Colombian Birds.—Mr. Bangs has recently published two additional papers on the birds of the Santa Marta district of Colombia, based on collections made by Mr. W. W. Brown. The first² relates to a small collection made at San Sebastian, in June and July, 1899, at altitudes ranging from 6600 to 9000 feet, on the opposite side of the Sierra Nevada de Santa Marta from the points where his previous collections were made. The list numbers 29 species, six of which had not been previously taken by Mr. Brown, one of the latter, *Acestrura astreans*, being described as new.

The second paper³ relates to the two species of *Henicorhina* found to inhabit the Sierra Nevada de Santa Marta region of Colombia, namely, the wide-ranging *H. leucophrys* and *H. anchoreta*, the latter here described as new, and as living in the higher parts of the mountains, at 11,000 to 12,000 feet, and above the range of *H. leucophrys*.—J. A. A.

Chapman on New Birds from Venezuela, etc.—A small collection of

¹ A New Race of Short-eared Owls. By Witmer Stone. Proc. Acad. Nat. Sciences Phila., 1889, p. 478. Separates issued Dec. 29, 1899.

² On a Small Collection of Birds from San Sebastian, Colombia. By Outram Bangs. Proc. New Engl. Zool. Club, I, pp. 75-80, Dec. 27, 1899.

³ The Gray-breasted Wood Wrens of the Sierra Nevada de Santa Marta. By Outram Bangs. *Ibid.*, pp., 83, 84, Dec. 27, 1899.

birds made by Mr. F. W. Urich in northern Venezuela,¹ and numbering only 37 species, proved on examination to contain 5 that were apparently undescribed, namely: (1) *Setophaga verticalis pallidiventris*, (2) *Chlorospingus* (*Hemispingus*) *canipileus*, (3) *Mecocerculus nigriceps*, (4) *Mecocerculus urichi*, (5) *Synallaxis striatipectus*.

Mr. Chapman has also described two new subspecies of *Colymbus dominicus*,² an examination of this group in the light of the material in the American Museum of Natural History showing that there are two continental forms quite different from true *C. dominicus* of the West Indies. To the South American form (type locality, Chapada, Matto Grosso, Brazil) he has given the name *C. dominicus brachyrhynchus*, in allusion to its very small bill, and to the North American form (type locality, Lomita Ranch, Lower Rio Grande, Texas) the name *C. dominicus brachyptera*.—J. A. A.

Chapman on Birds from Greenland.³—The American Museum of Natural History has received various collections of birds from Greenland during the last few years, in connection with the work of the several Peary Expeditions to North Greenland. These collections aggregate about 500 specimens, and include several especially interesting series of plumages of Eiders, Gyrfalcons, Murres, Kittiwakes, etc., which Mr. Chapman in the present paper has turned to good use. The number of species represented is 48, and many of them are accompanied by the field notes of one of the collectors, Mr. J. D. Figgins, who accompanied the Peary Expedition of 1896. Unfortunately, the field notes for the Expedition of 1895, when one of the most important collections was made, under the supervision of Prof. L. L. Dyche, were unavailable for use in the present connection.

Mr. Chapman gives special attention to the growth and phases of plumage in such species as Brünnich's Murre, the Kittiwake, Fulmar, Greenland and King Eiders, and the Gyrfalcons, several of which are represented by series illustrating all the changes from the downy chick to the fully adult birds.

Incidentally, Mr. Chapman takes up the question of the relationship of *Rissa tridactyla* to *R. t. pollicaris*, and finds that while the development

¹ Descriptions of Five Apparently New Birds from Venezuela. By Frank M. Chapman. Bull. Am. Mus. Nat. His., XII, 1899, pp. 153-156. Aug. 5, 1899.

² Description of Two New Subspecies of *Colymbus dominicus* Linn. By Frank M. Chapman. Bull. Amer. Mus. Nat. Hist. XII, 1899, pp. 255, 256. Dec. 23, 1899.

³ Report on Birds Received through the Peary Expeditions to Greenland. By Frank M. Chapman. Bull. Am. Mus. Nat. Hist., Vol. XII, 1899, pp. 219-244. Dec. 23, 1899.

of the hind toe in the two forms fails to be satisfactorily diagnostic, the difference in the amount of black tipping the outer primaries in the two forms is fairly constant and of sufficient importance to warrant their recognition as subspecies.

On the other hand, the extensive material of the Fulmar group leads Mr. Chapman to believe that the alleged differences between *Fulmarus glacialis* and *F. g. minor* are "ascribable to sexual and individual variation." In the case of *Somateria mollissima* and *S. m. borealis* he finds a marked difference in the size and form of the bill in the two forms, as shown by his measurements and outline figures, enough to warrant their recognition as well marked forms.

In describing the changes of plumage in the King and Greenland Eiders, Mr. Chapman distinguishes a post-nuptial plumage in the adult males, which begins to replace the nuptial in June, and affects all the brighter part of the plumage, and which in turn gives place to the breeding dress, reacquired during late autumn.

Mr. Figgins's field notes add great interest to the paper, and relate to the haunts and breeding habits of a large number of the species.—J. A. A.

• **Oberholser on the Flammulated Screech Owls.**¹—In a paper of sixteen pages, Mr. Oberholser has summarized our present knowledge of *Megascops flammeolus* and its western subspecies *M. f. idahoensis*. The former ranges from Guatemala to California, Arizona, and Colorado, and the latter from southern California to Washington and Idaho. Each form is described in detail, with full citation of bibliographic references, and such information on their habits and distribution as the scanty records thus far afford. A new record for *flammeolus* is Presidio County, Texas, while additional records for *idahoensis* are San Geronio Peak and the San Bernardino Mountains, California. In view of the considerable amount of variation shown by specimens from different localities, Mr. Oberholser believes that when more material is available the group will "be found separable into several more or less segregated geographical races."—J. A. A.

Oberholser on a Collection of Birds from Liberia.²—This collection consists of 57 specimens, representing 39 forms, four of which are here described as new, namely: (1) *Dendromus caroli arizelus*, (2) *Anthreptes*

¹ The Flammulated Screech Owls, *Megascops flammeolus* (Kaup) and *Megascops flammeolus idahoensis* Merriam. Par M. Harry C. Oberholser. Ornith. Bull. du Comité Ornithologique International, Vol. X, No. 1, Dec., 1899. (Separate, 16 pp., repaged.)

² A List of the Birds collected by Mr. R. P. Currie in Liberia. By Harry C. Oberholser, Assistant Biologist, Department of Agriculture. Proc. U. S. Nat. Mus., Vol. XXII, 1899, pp. 25-37.

idius, (3) *Dicrurus modestus atactus*, (4) *Fraseria prosphora*. Two new genera, *Horizocerus* and *Stelgidillas*, are also characterized, and a specimen of the rare Hawk, *Dryotriorchis spectabilis* is reported, the ninth specimen of this species thus far known.—J. A. A.

New Birds from the Bahamas.—Mr. C. J. Maynard, in an 'Appendix to Catalogue of the Birds of the West Indies' (which Catalogue we have not yet seen) has published (Nov. 29, 1899) descriptions of four new species of birds from the Bahamas, namely; (1) *Colinus bahamensis*, from the island of New Providence; (2) *Speotyto bahamensis*, from "New Providence and probably Eleuthera"; (3) *Dendroica bahamensis* ("similar to *Dendroica vigorsii*"), from New Providence; (4) *Hemotopus* (sic) *pratii* (provisional name), from Flemming's Key.—J. A. A.

Kopman on the Bird Fauna of Two Sections of Louisiana.¹—This paper gives a comparison of the representation of 67 species in contiguous but very different portions of southern Louisiana, the fertile alluvial coast district and the pine barrens to the northward. These two areas are separated by the chain of lakes formed by Lake Maurepas, Pontchartrain and Borgne, and mark an abrupt transition from the alluvial fertile district, with its deciduous arboreal vegetation, to the pine districts, or 'pine barrens,' which extend from the eastern border of Louisiana into Mississippi. While scarcely a dozen species are restricted to either of these areas, the relative number of individuals of birds which are common to both varies so greatly as to form a strong contrast in the general ornithological character of the two regions, obviously due to the difference in vegetation and coincident conditions of environment. The birds listed for comparison are mainly the commoner summer residents.—J. A. A.

Faxon and Hoffmann's Birds of Berkshire County, Mass.²—Berkshire County, Massachusetts, differs so much from the rest of the State in altitude and other physical conditions as to form a well-marked region, and one, moreover, until recently ornithologically very imperfectly known. With a general altitude of 1500 to 2000 feet, and with peaks rising from 2400 to 3500 feet, the general character of the fauna and flora is distinctly more boreal than that of that portion of the State to the eastward. For many years ornithologists were left to conjecture as to the birds frequenting the higher parts of 'The Berkshires.' As early as 1884, however, definite

¹ The Bird Fauna of Two Sections. By Henry H. Kopman. The Gulf Fauna and Flora Bulletin, Vol. I, No. 2, pp. 50-57. Dec. 15, 1899.

² The Birds of Berkshire County, Massachusetts. By Walter Faxon and Ralph Hoffmann. Coll. of Berkshire Hist. and Sci. Soc., Vol. III, No. 2, pp. 109-166. Also separate, 8vo, pp. 60. Issued Feb. 23, 1900.

information on the subject began to be a matter record, when Mr. Brewster published his list of 66 summer birds observed in the vicinity of Greylock Mountain (Auk, I, 1884, pp. 5-16), and five years later this was materially supplemented by Mr. Faxon's lists of the birds of Sheffield (76 species) and Greylock (80 species, Auk, VI, 1889, pp. 39-46, 99-107), and by Mr. Hoffmann's still later paper on the summer birds of Central Berkshire (Auk, XII, 1895, pp. 87-89). The present paper presents the combined results of these and other observations on the birds of Berkshire, the authors having made numerous visits to the region for the purpose of studying its bird fauna, not only in summer, but also in winter, spring and autumn.

While the list is admittedly incomplete, especially as regards the larger migrants and the winter stragglers, it presents all the information at present available on the subject, and is doubtless essentially complete as regards the summer birds of the region. The list, copiously annotated, numbers 197 species, with 4 additional subspecies, or, excluding the House Sparrow, just 200 forms. The first six pages contain a general account of the varied topographic and biologic characteristics of the region. Greylock is described as rising above the surrounding country like "an island of northern vegetation," and on its top have been found birds "whose normal habitat is the edge of the tree line of the loftier northern mountains," while in the Housatonic Valley a few southern or 'Carolinian' species find their way northward from southern Connecticut. A bibliography of several pages shows "the published sources of information available for the purposes of the list." The authors have chosen to impress upon their work a certain stamp of individuality by adopting an order of arrangement inverse to that of the A. O. U. Check-List, and in spelling a few of the technical names according to their particular preferences. The list appears to be a 'hard-and-fast' one, so far as it goes, every doubtful record being rigidly excluded, and, as already said, as complete as present knowledge renders it possible to make it.—J. A. A.

'Birds in Horticulture.'—In an address read before the Illinois State Horticultural Society,¹ Mr. Wm. E. Praeger makes a very good presentation of the facts in the case as regards the utility of birds to the horticulturist. He does not ignore the appropriation by certain birds of more or less fruit, but brings forward in offset the evidence of their extreme utility to the agriculturist at nearly all seasons, based on the investigation by competent experts of the general food habits of the species charged with injury to the crops. His conclusion is that in the case of the great majority of birds the good they do is so great and the harm, if any, so trifling that they should be encouraged and protected at all times.—J. A. A.

¹ Birds in Horticulture. By Wm. E. Praeger. A paper read before the State Horticultural Society at Springfield, Ill., Dec. 26, 1899. 8vo., pp. 12.

Stark's Birds of South Africa. Volume I.¹ Thirty-three years ago appeared Mr. E. L. Layard's 'The Birds of South Africa,' published at Cape Town in 1867, a new edition of which, revised and augmented by Dr. R. Bowdler Sharpe, was brought out in London, 1875-84. Layard's unpretentious first edition was for many years a most useful handbook on South African birds, and for many years was the only one available for English readers. It was greatly amplified and modernized by Dr. Sharpe, but, through the rapid progress of our knowledge of South African ornithology, it had again fallen behind and was becoming antiquated when Dr. Stark took up the work, for which he was so well fitted through his intimate personal acquaintance with the birds in life, acquired during many years of research and extensive travel in South Africa.

It is greatly to be regretted that before his task was finished he should have fallen a victim in the unhappy strife now raging in that country. After spending some time in London last year to see his first volume through the press, he returned to South Africa in September. On the outbreak of hostilities, he joined the medical staff of the British Army as a volunteer, and on Nov. 19, 1899, was killed at Ladysmith by a shell. Apparently the second volume was not well advanced, as 'The Ibis' for January, 1900 (p. 220), says: "We fear that it will be very difficult to find anyone to continue the work for which our much-lamented friend was specially competent from his long personal studies of the birds of South Africa in their native wilds."

The present volume "is the first of a series in which it is proposed to give an account of the Fauna of Africa south of the Zambesi and Cuné Rivers," under the general title 'The Fauna of South Africa,' and under the editorship of Mr. W. L. Sclater, Director of the South African Museum at Cape Town. The birds will occupy several volumes, of which the first, here under notice, includes about one half of the Passerine birds. In the general plan and arrangement, the Bird volumes are similar to Mr. Eugene Oates's 'Birds of British India.' The classification adopted, as regards the higher groups, is that proposed by Dr. P. L. Sclater in 1880, which divides birds into 21 orders. The subdivisions of the South African Oscines are mainly as proposed by Dr. Sharpe in 1891, and include 20 families, of which 12 are treated in the present volume, and include 182 species and subspecies. Of these 3 belong to the family Corvidæ, 16 to the Sturnidæ, 3 to the Oriolidæ, 60 to the Ploceidæ, 23 to the Fringillidæ, 29 to the Alaudidæ, 19 to the Motacillidæ, 16 to the Nectariniidæ, 1 to the Certhiidæ, 4 to the Promeropidæ, 4 to the Zosteropidæ, and 6 to the Paridæ.

The bird life of South Africa is, of course, of a strikingly different type from that of North America, the families prevailing there being entirely

¹The | Birds of South Africa | By | Arthur C. Stark, M. B. | Vol. I. | With a map and illustrations | London | R. H. Porter | 7 Princes Street, Cavendish Square, W. | 1900—8vo, pp. i-xxx + 1-322, 80 text cuts.

unrepresented with us, although shared with other parts of the Old World. The sixty species of Weaver Birds described in the present volume, the thirty species of Larks, the sixteen species of Starlings, and the sixteen of Sunbirds form five ninths of the birds treated in the present volume. Of these only the Larks have any American representatives, the genus *Otocoris*, alone of this immense family of more than 120 species and subspecies, reaching America. The Ploceidæ are practically 10 primaried Finches, but uniformly differ from the latter in building covered nests, which are often exceedingly elaborate, retort-shaped affairs, or massed into compound structures containing "from twenty to more than three hundred separate habitations, which have no communication with one another beyond being under the same roof," as in the case of the Social Weaver Bird. The collective nest is added to each year, "until either the tree in which it is built gives way, or its branches can afford room for no more material; fresh nests are then built in neighboring trees by the younger birds, about twenty pairs joining together to work at each." Besides the Weaver Birds, many other South African birds either build covered nests or occupy holes in trees or rocks, yet very few of the species breeding in covered nests or in holes lay white eggs. In fact, some of the Weaver Birds, as the species of the large genus *Hyphantornis*, are remarkable for the variability of color of even eggs of the same pair of birds. In the Masked Weaver Bird (*H. velatus*) "they are of some shade of white, cream colour, pink, green, or blue; often unspotted, but more frequently marked, more or less thickly, with small spots and dots of various shades of red and brown; less often they are blotched and clouded heavily with large masses of the same colours." The nest is retort-shaped, but is without a neck.

Dr. Stark's 'Birds of South Africa' is a well arranged 'manual,' giving the characters of all the higher groups, with keys to the genera and species, full references to the literature, very full descriptions of the species, including variations of plumage with sex and age, the geographical range, and short life histories. The cuts, drawn especially for the work by Mr. H. Grönvold, mainly illustrate structural features, the head, or head, wing and foot, being usually figured for each genus; and several of the remarkable nests of Weaver Birds and Sunbirds are also illustrated. The book is beautifully printed, on heavy paper, and is in every way as attractive as the text is satisfactory and authoritative. — J. A. A.

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NOTES AND NEWS.

GEORGE B. SENNETT, an Active Member of the American Ornithologists' Union, died at his home in Youngstown, Ohio, March 18, 1900, at the age of 59 years. Mr. Sennett was born in Sinclairville, N. Y., July 28, 1840, and for many years had been a prominent manufacturer of oil-well machinery and engines, with his place of business formerly at Meadville, Pa., and later at Youngstown, Ohio. Although an active business man, he was, nevertheless, an enthusiastic ornithologist, and for a number of years was able to devote considerable periods to field work and more or less time to original research in systematic ornithology. His special field of investigation was the Lower Rio Grande region of Texas, and his collection of Texas birds and birds' nests and eggs was the most extensive and most carefully selected and prepared ever brought together. His collection also includes many birds from northeastern Mexico, and a fair representation of the birds of North America at large. For many years this collection has been at the American Museum of Natural History in New York, where it has been of great service to the Museum, and has always been accessible to ornithologists desiring to make use of it.

His ornithological writings relate mainly to the birds of Texas, beginning with his 'Notes on the Ornithology of the Lower Rio Grande of Texas,' published in 1878, and his 'Further Notes on the Ornithology of the Lower Rio Grande of Texas,' published in 1879. In 1887 and during several following years his contributions to ornithological literature were frequent and important, his work being marked by keen insight, care and thoroughness. Later he became more deeply engrossed in business, but lost none of his interest in birds, and looked eagerly forward to an early retirement, when he would be free to devote his time to ornithological pursuits, including the completion of a long-projected illustrated work on the birds of Texas, on the preparation of which he had already spent much time and money. He was actively interested in the protection of birds, and for several years was chairman of the A. O. U. Bird Protection Committee. From 1887 to 1889 he was President of the Linnean Society of New York, to whose interests he was ever heartily devoted. He was genial, generous, kind-hearted and conscientious, and will be greatly missed by those who had the pleasure of his acquaintance.

In accordance with a standing order of the Union respecting deceased Active Members (see Auk, XII, p. 199), a special memorial of his life and work will be presented at the next meeting of the American Ornithologists' Union, and published later in 'The Auk.'

WILLIAM EDWIN BROOKS, a Corresponding Member of the American Ornithologists' Union, died at his residence, Mount Forest, Ontario, on January 18, 1899, at the age of 70 years. He was the son of W. A. Brooks, of Newcastle-on-Tyne, England, and was born in 1829. His father was chief engineer on the Tyne docks and harbor works, where for several years young Brooks was employed as his father's assistant. In 1856 he went to India as a civil engineer on the East India Railway, and was one of the original constructors of that line. In 1881 he came to Canada, and settled at Milton, Ontario, but later moved to Chilliwack, British Columbia, returning again to Ontario in 1891, and resided during his later years at Mount Forest.

His ornithological work related almost entirely to India birds; he was an active co-worker with Mr. Allan Hume, and from 1873 to 1880 published many papers on India birds in 'Stray Feathers,' in the 'Journal' of the Asiatic Society of Bengal, and in 'The Ibis.' He gave particular attention to the smaller Warblers, and was a special authority on the genus *Phylloscopus*, of which he discovered several new species. One of his latest contributions to 'The Ibis' related to this group. He also devoted considerable attention to the Raptores, closely studying the change of plumage in the smaller Eagles, which he kept alive for this purpose. His large collection of Indian birds is now in the British Museum. He was elected a Corresponding Member of the A. O. U. in 1886, and became a member of the B. O. U. in 1892. His son, Allan Brooks, is a well-known Canadian ornithologist.

FRANCIS C. BROWNE, an Associate Member of the American Ornithologists' Union, and an occasional contributor to the 'Nuttall Bulletin,' 'The Auk,' and to 'Forest and Stream,' died at his home in Framingham, Mass., Jan. 9, 1900, aged 70.

In speaking of Mr. Browne we find little that he himself would think worth recording about his life; few of those things which deserve to be called events. He was a modest, shy, reserved man, who loved nature and the observation of nature, and shunned public notice as if it were infection. After his graduation at Harvard College (1851) he never attended the annual class meetings and, it is believed, never cared to revisit Cambridge. He never sought amusement outside of his own home, excepting only his annual visit to Clark's Island in Plymouth, for duck-shooting at the season of the autumnal migration. Although of most amiable and kindly temper and holding liberal views, he cared little for society or to make intimate acquaintance among his towns-people. He seldom went to Concord where he had passed his youth and was fitted for college, and where he had many attached friends and relatives. His chief delight and the occupation of his leisure hours was to arrange and catalogue his possessions in bird skins, shells and coins, upon which he spent a not inconsiderable amount of money, and to which he was constantly adding, by purchase or exchange, up to the last month of his life.

Mr. Browne was a born naturalist, and his mind was doubtless stimulated in his boyhood by the society of such men as Henry Thoreau, Channing, and Ralph Waldo Emerson (who married Mr. Browne's aunt), in Concord, and also by association with Dr. Charles T. Jackson, the discoverer of ether, who was his uncle.

While in college, he was soon made a member of the Harvard Natural History Society, and its Curator of Ornithology, and quickly became distinguished among his fellows by his work in arranging the cabinets of specimens and by his literary communications at the meetings of the society. He became, moreover, at about this time a frequent visitor at the rooms of the Boston Natural History Society, then in Mason St., Boston. To their collection he made some valuable gifts of birds shot by himself. He was also a frequent attendant at the meetings of this society, of which Dr. C. T. Jackson was President. Here he came to know such men as Agassiz, Jeffries Wyman, Gould, Storer, Bryant, Cabot, and others, and saw many of the distinguished naturalists of the time. Mr. Browne was also an early member of the Nuttall Ornithological Club of Cambridge, and of the American Ornithologists' Union.

In 1850 (his junior year), his health compelled him to give up study for a time and he went to Labrador, where he collected many birds among others a fine 'Labrador' or 'Black' Gyr Falcon, which he presented to the Boston Natural History Society. This bird, little known at that time, was the first of the species to be placed in the society's collection. It was largely through the influence of Mr. Browne that the first specimen known to have been certainly taken in Massachusetts of the Glossy Ibis was given to this society in 1850. His neat article on this subject, published in 'The Auk' for April, 1887, p. 97, tells the whole story. Mr. Browne had in his collection a unique specimen, a little Black Rail, so far as known the first of that species taken in New England, and still rarely found there. It was picked up dead on Clark's Island, Plymouth Harbor.

In the early spring of 1851, Mr. B. went to Florida where he joined Prof. Agassiz's party at Key West. He camped in the Everglades and upon the Miami River, and secured many, at that time, rare and valuable specimens.

Mr. Browne was, in his college days, an enthusiastic sportsman, and loved a dog and a gun and a solitary tramp in the woods above everything; and this love continued to the end of his life. With the instinct of a true sportsman and naturalist he recognized and drew to him all those who shared his tastes. So scrupulously did he avoid observation that few but the true ornithologist and mammalogist, or the expert in conchology, were aware of his knowledge in these departments, and they knew him chiefly by correspondence.

Throughout his college life he kept a diary which is especially rich in recounting his experiences as a hunter and collector. He gives a detailed

account of his trips to Labrador and Florida, and this journal has to-day for those who knew him and remember his old associates, a peculiar charm. Soon after he came to Framingham his journal ceases.

It was intended that he should study some profession, but his eyesight failing he was compelled to give up books and was advised to take a farm, and so began life in Framingham in 1853, and remained there until his death. In his domestic relations he seems to have been most fortunate and happy. He was a devoted son, and when married found his chief delight in the attractions of a pleasant, retired home among meadows, ponds, and woods. He married early a charming woman who appreciated his character and made his house attractive.

We know that when Mr. Browne was about ten or twelve years of age he was at Brook Farm under the tutelage of A. Bronson Alcott and living in his family. This early training and his attachment to Henry Thoreau may have had much to do with determining his tastes and the bent of his mind. His character was marked by a modest self-appreciation, a dislike of all show or pretence, a love of honest simplicity in living and thinking, and of all that is true and pure. He was always humble, charitable to the views of those who differed from him, apt to question the value of his own observations, seldom referring to his contributions to science. Simple and refined, he was always a gentleman and a scholar without pretending to the rôle of either. He had no coarse streaks about him; he had a discriminating taste in literature and loved music. We are indebted to him for many contributions to our knowledge of bird-life (migrations, habits, etc.), things which only patient, loving attention and study could enable any one observer to discover. He took pride in keeping abreast of modern ideas upon ornithology and nomenclature, and was a diligent reader of 'The Auk' and other journals of his favorite science.

Mrs. Browne outlived her husband but a few days leaving one child, a daughter. —Z. B. ADAMS.

JOHN A. DAKIN, an Associate Member of the American Ornithologists' Union, died, after an illness of six days, at his home in Syracuse, N. Y., Feb. 21, 1900, at the age of 48 years. Mr. Dakin was born at Hillsdale, Columbia County, N. Y., in 1852, but when a small boy moved to Tully, N. Y., with his parents, where he received his first education in one of the district schools. He early manifested his love for birds, and later acquired a thorough knowledge of the birds of Onondaga County. In 1882 he went to Florida and hunted through the Everglades and along the Oklawaha River, collecting specimens and studying the birds of that region. He also gave much attention to the heronries, which were then innumerable on the brushy islands and shores of White Lake. After remaining in Florida four years he returned North, and fixed his home in Syracuse. In 1893 he took up the study of Lepidoptera, which he

pursued with equal enthusiasm with that of birds, and when he died had one of the largest collections of North American Lepidoptera in this section. He was a charter member and founder of the Onondaga Academy of Sciences, and contributed to it many valuable papers on the birds and insects of Onondaga County. He was a great advocate of bird protection, and read many papers on this subject before schools and other societies. He was gifted with a graceful pen, and his simplicity of style made his writings peculiarly attractive. He possessed a singularly attractive personality, which endeared him to all; and his honesty, modesty, and lofty principles won for him universal esteem.—A. W. PERIOR.

FOSTER H. BRACKETT, an Associate Member of the American Ornithologists' Union, died at his home in Dorchester, Mass., January 5, 1900, aged, 37 years. He was born in Fall River, Mass., but his parents removed to Roxbury, Mass., when he was a year old, where he received his education in the public schools and at a business college in Boston. When twenty years of age he entered the banking house of Blake Brothers & Co., Boston, with whom he remained till his death. Mr. Brackett was especially interested in the study of birds, to which all his leisure time was devoted, and had just acquired great familiarity with the birds of New England, of which he had made a considerable collection. His ornithological publications consisted of a few notes contributed from time to time to 'The Auk.' His many amiable traits of character had won for him a wide circle of friends. A widow, a son and two daughters survive him.

ON JANUARY 4, 1900, the Delaware Valley Ornithological Club celebrated the tenth anniversary of its organization. The meeting was held at the Academy of Natural Sciences of Philadelphia, the addresses being by Mr. Witmer Stone 'On the History of the Club,' and by Mr. Wm. L. Baily on 'Ornithological Photography.' Starting with a membership of seven in 1890, with the idea of making combined observations on bird migration in the Delaware Valley, the Club has grown to a membership of 88. Besides the establishment of regular bimonthly meetings, the organization has issued several publications, notably the 'Birds of Eastern Pennsylvania and New Jersey,' and has presented the Philadelphia Academy with an excellent local collection of birds and nests. It is now established on a firm basis, and it is to be hoped it will continue to increase the general interest in ornithology in Philadelphia and its vicinity, which it has been instrumental in arousing. Among the papers read during the year were the following: 'Probable Breeding of the Prothonotary Warbler in Delaware,' by W. Gordon Smith; 'The Heath Hen in Martha's Vineyard,' by H. L. Coggins; 'Glimpses of Bird Life in Mexico,' by S. N. Rhoads; 'Life and Habits of the Clapper Rail,' by I.

N. De Haven; 'Spring Flight of Shore Birds at Holly Beach, N. J.,' by W. L. Baily; 'History of the Little Black Hawk in Florida,' by C. J. Pennock. The officers for the ensuing year are: President, Charles J. Rhoads; Vice-President, Chas. J. Pennock; Secretary, Henry W. Fowler; Treasurer, Wm. L. Baily.

At a recent meeting of the State Horticultural Society of Illinois, the following resolution was unanimously adopted:

"*Whereas*, Great progress has been made in the last few years in our knowledge of the economic relations of the birds, and it is now known that the birds have a direct and important influence on horticulture; and that their presence in our orchards and fruit gardens is essential to the preservation of the crops from insects; therefore be it

"*Resolved*, That a better knowledge of the birds, of their effects on horticulture, their habits, the conditions governing their actions, methods of encouraging their presence and of protecting the fruits while ripening from their attacks ought to be spread among the people of our State; that this Society, therefore, urges the consideration of this question on our branch societies, our Farmers Institutes, and all kindred institutions; and we further desire that the study of the birds should be more extensively introduced into our schools and a knowledge of their habits and their value spread among our young people, by all practicable means, and thereby assist in the enforcement of the already efficient laws now in existence."

DURING the past three months some important results in bird protection have been accomplished by members of the Union working in conjunction with the Protection Committee. Early in March a notice appeared in a Philadelphia paper giving details of a contract between certain parties in Delaware and a commission house in New York, by which the former were to procure and ship to the latter 20,000 bird skins for millinery purposes. The Chairman, Mr. Stone, in company with Mr. Poole, President of the Delaware Game Protective Association, visited Governor Tunnell of Delaware, and found him to be enthusiastic on the subject of bird protection. He proposed to have the Secretary of State issue a warning about shooting insectivorous birds. As the Pennsylvania Railroad system controls all the railroads in Delaware, a letter was written to the President, Mr. A. J. Cassatt, calling his attention to the contract and also to the Delaware statute regarding common carriers transporting birds out of the State. A reply was received in due course of mail saying: "The attention of this Company's agents in Delaware has been called to the law to which you refer and they have been cautioned to conform strictly thereto." Mr. J. B. Thayer, Jr., General Freight Agent, issued order 'G. F. A. No. 221½' as a large poster "to be posted in two public and conspicuous places in each Freight Station: Law Prohibiting the Killing or Destruction of Birds in the State of Delaware." Then follows the full text of the law, followed by the order: "Agents

are instructed that this law must be strictly observed, and they must, therefore, decline to receive any such birds for transportation." Mr. Thayer also wrote: "We have requested the Adams Express Company to issue a similar notice to express agents, to cover service by express."

This agitation has aroused the whole State, and farmers are posting their land. The public press gave valuable aid, and it is probable that every person in Delaware now knows the reasons for bird protection. It is hoped that another Audubon Society may result.

The Union has always found the U. S. Lighthouse Board very heartily in sympathy with the work of bird protection, and it has lately issued the following order to the district officers of all the lighthouse districts on the Atlantic, Gulf, Northern Lake, and Pacific coasts: "The Board requests you to issue a circular letter to all light stations in your district cautioning light keepers against the violation of the game laws of the States in which they may be stationed, and to inculcate in them a spirit of protection, not only of the game birds, but of song birds, and of all bird life."

Our member, Mr. Abbott H. Thayer, recognizing the frightful destruction of the Gulls and Terns that has been going on for a few years past, and the immediate necessity for special protection for the small remainder, made an appeal to the public through a selected list of newspapers, for funds to be used in hiring wardens to protect the birds while nesting. Already quite a large number of subscriptions have been received by the Treasurer, aggregating \$600. Active efforts are being made to locate breeding colonies of seabirds along our Atlantic seaboard, and as fast as any are found, to obtain the services of a trustworthy and fearless warden to protect them during the breeding season. All the Massachusetts colonies of Terns are being cared for as usual this year by their devoted guardian, our fellow member Mr. Geo. H. Mackay. The Tern colony that was driven from Great Gull Island, N. Y., when it was occupied by the General Government as a site for a fortification, has gone to Gardiners Island, N. Y., where they are afforded absolute protection by the owner, Mr. John Lyon Gardiner, and Mr. F. Aug. Schermerhorn, who has the shooting rights on the island. Both of these gentlemen are ardent and enthusiastic bird protectors.

Arrangements have already been made to protect the Terns breeding in southern New Jersey, and the U. S. Lighthouse Board has issued special orders to the light keeper at the Great Duck Island Light Station, Maine, to prevent the destruction of the colony of Herring Gulls that live on that lighthouse reservation. Plume hunters and milliners' agents, having nearly exterminated the sea birds on the southern and middle Atlantic coast, have attacked our northern seaboard. Maine ornithologists complain that commercial houses in New York and Boston send agents along the Maine coast offering to purchase all the seabirds that can be killed. In one case a dealer furnished guns and ammunition to the Quoddy Indians to help on the dreadful work. In

this connection the Protection Committee consider it the urgent duty of every member of the American Ornithologists' Union, to write at once to his representative in Congress requesting him to help the passage of House Bill No. 6634, introduced by the Hon. Mr. Lacey of Iowa, which is to enlarge the powers of the Department of Agriculture, to prohibit the interstate transportation of game killed in violation of local laws, and for other purposes. It provides "that it shall be unlawful for any person or persons to deliver to any common carrier, or for any common carrier to transport from one State or Territory to another State or Territory . . . the dead bodies or *parts thereof* of any wild animals or birds, where such animals or birds have been killed in violation of the laws of the State or Territory in which the same were killed." If this bill becomes a law it will do much to stop the traffic in bird skins for commercial purposes; and it will then be necessary to have uniform bird laws in all the States and Territories. The Protection Committee therefore request that members of the Union in the several States take up the matter of local bird laws and consult with the Committee preparatory to a concerted movement in the fall and winter of 1900-01.

The New York Audubon Society introduced a bill in the Legislature in January, through Assemblyman Hallock, amending sections 33 and 39, Chapter 20 of the laws of 1900, 'Certain Wild Birds Protected,' by adding the words: "No part of the plumage, skin or body of any bird protected by this section shall be sold or had in possession for sale." There is every prospect that this amendment will become a law.

Commission houses in New York City, in their endeavor to obtain bird skins for millinery purposes, send out many circulars offering varying scales of prices for bird skins. Recently a postal card was sent by one of these firms to postmasters along the Gulf coast soliciting Gulls, Terns, Grebes, Barn Owls, etc. Our member, Dr. T. S. Palmer of Washington, brought this matter to the attention of the Hon. Jas. Wilson, Secretary of Agriculture, who at once sent a very urgent letter to Hon. Chas. Emory Smith, Postmaster General, calling his attention to this direct violation of the law. His response was quick and direct:

"Caution to Postmasters — Protest against collection of plumed birds through Postmasters.

"Post Office Department, Washington, D. C., Feb. 2, 1900.

"The attention of postmasters is called to a letter received from the Secretary of Agriculture, which is printed herewith.

"Postmasters are expressly enjoined against being parties to any transaction that violates State law.

CH. EMORY SMITH,
Postmaster-General."

The recent activity of dealers in bird skins for millinery purpose has thus happily done much to arouse public sentiment in behalf of the birds, and has led to renewed and successful action against their nefarious business. — WILLIAM DUTCHER.

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OCCURRENCE OF *LARUS GLAUDESCENS* AND OTHER AMERICAN BIRDS IN HAWAII.

BY H. W. HENSHAW.

A CERTAIN interest attaches to the occurrence of birds in regions far distant from their customary bounds because such occurrences indicate one of the ways in which species are distributed. More than usual interest attaches to the occurrence of foreign species in the Hawaiian Islands because of the remoteness of the Island from continental areas, California, the nearest mainland, being some two thousand miles distant. The following desultory notes, therefore, will not be without value.

GLAUCOUS GULL (*Larus glaucescens*).

This Gull is becoming an irregular though a rare visitor to the island of Hawaii, following vessels from San Francisco to Hilo. I learn from the captains of several vessels sailing between the two ports that the numerous Gulls that frequently attend the course of outward bound vessels usually turn about when off shore a hundred miles or so. Occasionally, however, one or two Glaucous Gulls, for some reason or other, fail to join their fellows on their homeward course, and day after day steadily follow in the course of the Island bound vessel. Such birds frequently, perhaps always, roost at night upon the yards.

Recently two Glaucous Gulls followed one of the U. S. transports from San Francisco clear into Hilo harbor where they lingered for several weeks and then disappeared, no one knows where. This particular transport happens to be painted white, which fact recalls the statement of an old mariner that Gulls are much more likely to follow in the wake of a white vessel than of any other, the simple explanation being that the birds are not so likely to lose track of a white vessel.

I have examined two Glaucous Gulls, shot in Hilo harbor, during my five years' residence in Hilo out of five or six that have been reported in this interval. One of them was in fine condition but the other weak and much emaciated.

I believe that none of these wanderers ever attempt to return to America but their final fate is unknown. No hint of the Glaucous Gull establishing itself upon the Hawaiian Islands is recorded, so far as I know, and the Islands are but illy adapted to their habits. The bird islands to the northwest, Laysan and others, would seem to be in every way adapted to this bird, and there in time the Glaucous Gull may become established.

That other species of American Gulls occasionally find their way to the Islands in the wake of vessels, especially to the harbor of Honolulu, is highly probable, and only the paucity of observers has prevented their detection and record.

BROWN GOONEY (*Diomedea chinensis*).

Every outward bound steamer and sailing vessel is met when well off shore from San Francisco by a number of Brown Goonies that fall into the vessel's wake and attach themselves to her till within a few hundred miles of the Islands, occasionally till within sight of port. As this Albatross was found by Mr. Rothschild's collector, Mr. Palmer, breeding abundantly upon Laysan there is nothing surprising in the above save the very business-like way the birds have of following vessels for the sake of the few scraps of meat thrown overboard, and the added fact that the Goonies also roost upon the vessels' yards at night.

RED-BREASTED MERGANSER (*Mergus serrator*).

I am not aware that this Duck has hitherto been recorded from the Islands where it is a casual and possibly a rather regular winter visitor. Nov. 8, 1899, one of these Mergansers was shot by Mr. Otto Rose of Hilo near the town, being one of two seen. Nov. 28, I shot the surviving bird a mile or two further down the coast in a small salt water pond. It was fat and in fine order, and had in its throat two of the common fresh and brackish water fish known to the natives as Oopu.

The natives, to whom I showed this Duck, seemed in nowise surprised, claiming to have seen the species before though rarely. They gave it the name Mohá, but as this name is applied also, according to Mr. Dole, to the Shoveller its correct application is open to doubt. Present day natives know extremely little of Hawaiian birds and usually are either unable to name a bird at all or are in doubt.

In time, no doubt, as stated of the Gulls, particularly all the species of our northwest Ducks will be noted from the Islands, nothing being more likely than that a few stragglers will accompany the flocks of Shovellers and Pin-tails which are regular winter visitors.

RED PHALAROPE (*Crymophilus fulicarius*).

Brother Matthias of the Catholic Brotherhood has a mounted specimen of this bird in winter dress which he shot, together with several others, on the island of Mani in December, 1894. So far as I am aware this is the first record of the bird's occurrence upon the Islands. Brother Matthias informs me that the Phalaropes frequent some small inland ponds at Kahalui and are of not uncommon though irregular occurrence, two or three years often elapsing between their visits.

At the same time and place Brother Matthias shot two American Curlews (not the Bristle-thighed) which I judge from his description to be probably *Numenius hudsonicus*. These speci-

mens are still extant, and later I hope to be able to see and to identify positively the species.

Since the above was written I shot another Red Phalarope from a flock of Akekeke (*Arenaria interpres*) on the Hawaiian coast near Hilo, April 6. The bird may yet be found to be an irregular winter visitor to Hawaii, coming down with the flocks of Plover and Turnstones. That it should associate with the Turnstone, and with them feed in the upland cane fields, is rather remarkable. The flock from which my specimen was shot was on its way from upland to its roosting places on the coast.

SANDERLING (*Calidris arenaria*).

This species is recorded from Kanai by both Stejneger and Wilson. It appears to visit the Kau and Kona coasts of Hawaii annually in small numbers. In October, 1899, I shot two individuals at Kaalualu, Kau, and Mr. Sam Kauani, a resident who is well posted on the shore birds of the locality, assured me that it was by no means uncommon, and sometimes was seen in small flocks, oftener one or two in company with the Akekeke (*Arenaria interpres*).

WILSON'S SNIPE (*Gallinago delicata*).

Mr. George C. Hewitt, Manager of Naaleho Plantation, Kau, informs me that he killed a 'Jack Snipe' near Naaleho some years ago. Mr. Hewitt is a sportsman and is very sure that the bird was no other than Gallinago with which he is well acquainted.

I feel sure that Island records of the shore birds of the northwest will multiply as time goes on. The immense flocks of Plover and Turnstone that each year wend their way from the American coast to the island must surely prove a magnet to attract other species hither, to say nothing of occasional individuals that mingle with these species in migration and unwittingly accompany them in their flight till all unwittingly they find themselves on foreign shores.

The whole subject of the migration of the Plover and other species to and from the distant mainland is of exceeding interest. Especially interesting would be any book bearing upon the manner of these migrations and the time taken in the flight.

As is well known, both the Plover (*Charadrius dominicus fulvus*) and the Akekeke (*Arenaria interpres*) leave the Island early in May in immense numbers and return in August. My friend, Mr. Patton, of Hakelau, Hawaii, has several times observed parties of Plover making the land, and always in a tired, if not an exhausted, condition. Once on land they seem to desire nothing but a chance to rest, but soon recuperate and go to feeding.

Capt. Chas. Watson has captained ships for years between San Francisco and Hilo. He tells me that only twice has he seen migrating birds, once flocks of Ducks flying north from the Islands, and once great numbers of Plovers¹ taking the same course. It is worth noting that in both instances this vessel was about 2000 miles to the north and west of Hawaii, and the inference is that the birds were steering a straight course for the Aleutians. I hope to learn of other masters of vessels who can furnish notes upon this subject, and especially do I hope to find some one who has seen the migrating flocks of Plover resting upon the ocean. For it does not seem probable that such good swimmers as are the Plover and Turnstone attempt to make so long a flight without rest, even if their powers of wing are equal to a task of such magnitude, which may be doubted.

In the above connection a note by Mr. Rothschild's collector, Mr. Palmer, is of great significance. He says (*Avifauna of Laysan*, Pt. I, p. 14), "A KOLEA . . . flew also round the ship and considerably astonished me by settling on the water several times to rest." This was in August and the bird most probably had just made the downward trip from Alaska. If Plover and Turnstone rest freely upon the oft times calm Pacific, their passage over such long distances is more readily comprehended. That the Ducks can and do rest upon the ocean when tired, is not to be doubted. Even so, however, it is a mystery that birds should

¹ The term Plover upon the Islands usually includes both the Plover proper and the Akekeke, few discriminating between the two birds.

venture so far for a few months' sojourn upon the sunny Pacific Isles. However favorable the conditions, the trip must be full of hardship and danger, especially to the old, the young, and the sick, and doubtless thousands occasionally perish on the way, particularly in stormy weather. Why leave the safe mainland for islands twenty-five hundred miles away? In this connection it is of interest to note that by no means all the Kōlea and Ake-keke and Ulili (*Totanus incanus*) leave the Islands in spring. Thousands of the two former species remain all summer in the uplands and the Ulili is by no means uncommon along shore. I have examined numbers of such loiterers and find them, without exception, to be young birds, apparently birds of the year probably too immature to feel the mating impulse.

Adult birds on the contrary, shot in April, which already have assumed the nearly complete nuptial dress, reveal clearly upon dissection the effect of the all controlling passion, and I am not sure that in some cases they are not already paired before leaving the Island. Some wounded adult birds must preforce remain behind while their fellows, in obedience to the homing instinct—the strongest impulse that stirs the avian breast—seek the Alaskan tundras. Why do not such island prisoners breed? Food would seem to be abundant here in summer as in winter, and so far as temperature is concerned, the flanks of the lofty Hawaiian mountains offer any temperature from that of perpetual summer to everlasting winter.

NOTES ON THE BREEDING HABITS OF THE AMERICAN GOLDEN-EYED DUCK OR WHISTLER
(*CLANGULA CLANGULA AMERICANA*).

BY WILLIAM BREWSTER.

Plates VI and VII.

In 1897 I spent the last two weeks of May and nearly the whole of June at Lake Umbagog, living in a house-boat and devoting my time to studying and photographing birds and nests. Besides a cook and a man to manage the boat, I had with me two assistants, Mr. R. A. Gilbert, who helped me in various ways, and Mr. Clarence H. Watrous, a keen and persistent nest-hunter, to whose tireless efforts I was indebted for the subjects of some of my best notes and pictures. Our floating house proved admirably adapted to the purposes of such a trip, having, in addition to comfortable living and sleeping accommodations, a small but well arranged dark room in which the negatives were developed. By sculling when the weather was calm, with the aid of a sail when there was a favoring breeze, we were able to change our ground whenever we wished to do so, although we often found it profitable to spend several days, and occasionally as much as a week, in one place, moored to the shore at the head of some sheltered cove, where the songs of shy forest birds rose on every side, and the delicious scent of the balsams stole in through the open cabin windows, or riding at anchor sufficiently far out in the lake to escape the black flies and mosquitoes. Our daily excursions were made chiefly by water in canoes, and extended not only to every part of the lake, but for considerable distances up the rivers which flow into it. Altogether it was a delightful experience, full of interest, and not wanting in novelty, despite the fact that the region was one with which I had long been familiar.

During this season I learned much that was new to me concerning the breeding habits of the Golden-eyed Duck or Whistler. This species still nests abundantly at Umbagog, especially about the outlet and throughout the bottom lands of the Lower Megalloway River, where the forests were killed half a century ago by

the back water from the dam at Errol. Many of the trees have fallen or been cut away by the lumbermen within recent years, but enough remain to furnish nesting places for numerous Tree Swallows, Bronzed Grackles, Woodpeckers, and Whistlers, besides a few Wood Ducks, Hooded Mergansers, and an occasional pair of Goosanders.

All the Whistlers' nests which I have examined have been placed over water at heights varying from six or eight to fifty or sixty feet and in cavities in the trunks of large hard wood trees such as elms, maples, and yellow or canoe birches. As the supply of such cavities is limited, even where dead or decaying trees abound, and as the birds have no means of enlarging or otherwise improving them they are not fastidious in their choice, but readily make use of any opening which can be made to serve their purpose. Thus it happens that the nest is sometimes placed at the bottom of a hollow trunk, six, ten, or even fifteen feet below the hole at which the bird enters, at others on a level with and scarce a foot back from the entrance, which is usually rounded, and from six to fifteen inches in diameter, but occasionally is so small and irregular that the Whistler must have difficulty in forcing its bulky body through. I remember one nest to which the only access was by means of a vertical slit so narrow and jagged that it would barely admit my flattened hand.

The eggs are laid on the rotten wood or whatever other debris there may be at the bottom of the cavity. When the set is complete (never before, so far as I have observed) the bird places under, around, and even over the eggs, down plucked from her breast. The quantity of down varies greatly in different nests. Sometimes there is only a very little about the sides and bottom of the cavity; often the eggs are warmly banked and completely covered with down, while there is usually more or less clinging to the edges of the entrance hole.

The number of eggs in a completed set varies greatly. Occasionally there are but five or six, oftener from eight to ten, not infrequently as many as twelve or fifteen, while I once found nineteen, all of which almost certainly belonged to one bird. It is by no means uncommon, however, for two females to lay in the same nest, and several of the rounded, pure white, thick-shelled



FIG. 1. YOUNG WHISTLER, TWO DAYS OLD.

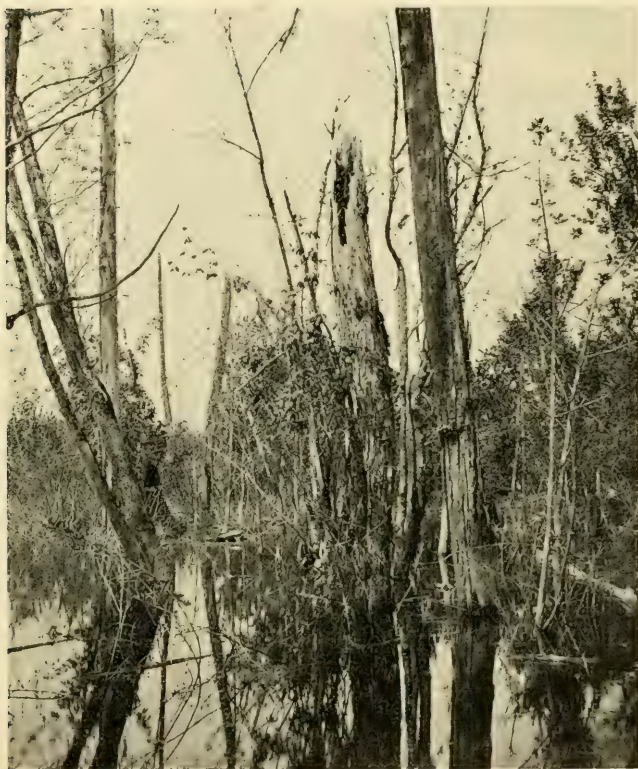


FIG. 2. NEST WHICH THE YOUNG WHISTLERS WERE SEEN TO LEAVE.

eggs of the Hooded Merganser are sometimes included in a set of the green, thin-shelled eggs of the Whistler. The whole bottom of the nesting cavity, be it large or small, is usually covered with eggs, and they are often piled in two layers or set on end, and packed so closely that it is as difficult to remove the first as to take a book from a tightly filled shelf.

I used to suppose that in the cases of composite sets the labor of hatching the eggs and rearing the young was performed, however unwittingly or unwillingly, solely by the original owner of the nest, or, in other words, that the Ducks which laid in the nests of other birds, whether of their own or of a different species, were simply parasitic, after the manner of the European Cuckoo and certain of the Cowbirds, but in 1897 I obtained evidence which seems to point to a different conclusion, at least as far as the Whistlers are concerned. Most of this evidence, as well as certain other observations on the breeding habits of the Whistler, is contained in the following notes, which I give nearly as I find them in my journal.

May 30. We sailed the house-boat up the Lake to-day and anchored near the edge of the flooded forest at the outlet where we intend spending a week or more. Soon after reaching this place we saw four female Whistlers flying together in a peculiar manner over the trees, now rising high in air, next descending and dashing among the trunks and branches, vibrating their wings rapidly and continuously as in ordinary flight, but describing circles about a remarkably tall stub with a shattered top. Around this they would pass a dozen times or more, gradually drawing nearer until one bird leaving the rest and pitching first downward, then sharply upward, would fly directly toward the stub and try to alight on its jagged top. The attempt usually failed, when the bird, continuing its flight, would disappear among the trees, presently returning to begin circling again; but twice it gained a foothold and remained perched for several seconds, although it had to keep its wings in constant motion to maintain its balance. Sometimes its flight was directed to a point near the top of the tree where there was a round, neat-looking hole, no doubt the entrance to a nest, for we afterward saw two Whistlers emerge from it in quick succession. We thought that all four birds tried in turn either to

alight on the stub or to enter the hole, but as we could not distinguish between them, and as no two made the attempt at the same time, this impression could not be verified. They were silent for the most part, but occasionally one of them would utter a sound not unlike the quack of a Black Duck but shorter and flatter and repeated very rapidly six or eight times.

May 31. In a short, hollow maple trunk where a Whistler nested last year we found this morning a set of eleven eggs, none of which were covered with down although they were evidently near hatching. This nest is within thirty yards of the tall stub about which the four Whistlers were circling yesterday. The entrance is at the top about twelve feet above the water.

June 2. We found a Whistler's nest to-day by watching the female. She first alighted on the water near the tree and for fifteen or twenty minutes swam or drifted idly about preening her feathers. Then she flew out over a space of open water and turned back toward the tree, describing a great loop and rising gradually until she had attained an elevation of about twenty feet when she made directly for the entrance to the nest; which was about thirty feet above the water. On nearing it she pitched up sharply for the remaining ten feet, keeping her wings in rapid motion up to the last moment, but checking her speed very considerably before she reached the hole. Some intervening branches prevented us from seeing just how she entered it. Approaching the tree quietly I took a position which commanded a good view of the hole when my companion struck the base of the trunk lightly with his paddle. The blow was immediately followed by a scratching sound, and the next instant the Whistler shot out over our heads. Although I was watching the hole intently I did not see her leave it. She seemed, indeed, to burst forth at nearly full speed and I was half inclined to believe that she began her flight within the trunk. It seemed incredible that so heavy and clumsy a bird could emerge from such a place so adroitly and get under headway so quickly. Not that this particular hole was exceptionally small. On the contrary it was of rather generous size. Its shape and position are illustrated by a photograph which I took of the tree.

June 7. Yesterday at 3 P. M. Watrous examined the Whistler's nest found May 31. Several of the eggs were chipped. This

evening, just before sunset, he found all but two hatched and the nest filled with the pretty ducklings. The old bird was sitting on both occasions. To-night she returned and reëntered the hole before Watrous had paddled one hundred yards from the tree.

June 8. I visited the Whistler's nest shortly before daybreak this morning, approaching it with great caution. The old bird was absent and at first I feared that she had removed her young during the night, but on looking into the hole I was delighted to find them still there, huddled closely together in a circle, and shivering a little, for the air was keen. There were, however, only *six* of them with the two eggs still unhatched. What can have become of the remaining three eggs or young? Watrous tells me that he did not count the eggs on the 6th, nor the young last evening, but he is very certain that none of the eggs were missing on the former occasion, for the nest seemed to be full of them, and the absence of as many as three would have left a gap that he could scarcely have failed to notice. He is less sure that there were more than six young and two eggs last night.

Feeling confident that the young would leave the nest sometime during the day, I determined to see, if possible, how they would accomplish it. Accordingly after examining the nest, I concealed my boat about thirty yards from the tree and stretching myself at full length on the bottom, with my head raised just enough to enable me to look over the gunwale, remained there for nearly two hours. Nothing of interest happened until 5.10, when a female Whistler came from the direction of the Megalloway and without any preliminary circling dropped into the water within a few yards of the nest tree. After floating motionless for about two minutes with head and neck erect, evidently watching and listening intently, she flew directly to the hole and alighting on its edge, perched there for an instant, flapping her wings a little to maintain her balance. She then popped in, throwing up her spread tail just as her body disappeared, much as a Duck does when diving. I saw nothing more of her during the next hour, but soon after she entered the nest two other female Whistlers flew over and around me several times and one of them finally alighted on the water and swam to the base of the stub, looking up at the hole intently as if she, too, had some interest in it. On

several occasions within the past few days we have seen three or four Whistlers hanging about this nest. These facts lead me to suspect that they have been taking turns at incubating the eggs and that one of them may have taken away the three missing young.

At 6.15 I returned to the house-boat for breakfast and Gilbert took my place. It was arranged that he should shout if the Whistler began taking out her young while I was away. I heard his signal just as I was preparing to go back and when I rejoined him found that I was too late. This is his account of what happened during my absence:—

“At 6.45 the old Duck appeared at the entrance to the nest, where she sat for five minutes moving her head continually and looking about in every direction included within her field of vision; then she sank back out of sight, reappearing at the end of a minute and looking about as before for another five minutes. At the end of this second period of observation she flew down to the water and swam round the stub three times, clucking and calling. On completing the third round she stopped directly under the hole and gave a single loud cluck or call, when the ducklings began scrambling up to the entrance and dropping down to the water in such quick succession as to fall on top of one another. They literally *poured* out of the nest much as shot would fall from one's hand. One or two hesitated or paused for an instant on reaching the mouth of the hole but the greater number toppled out over the edge as soon as they appeared. All used their tiny wings freely, beating them continuously as they descended. They did not seem to strike the water with much force.

“While this was going on the old Duck sat motionless on the water looking up at the nest. When the last duckling dropped at her side she at once swam off at the head of the brood, quickly disappearing in a flooded thicket a few rods away.”

In this connection it may be well to dwell for a moment on some of the statements which have been made by writers as to the manner in which the young of tree-nesting Ducks leave the nest. Dresser affirms (*Birds of Europe*, VI, p. 600) that the young of the European Golden-eye “are carried by the female in



FIG. 1. WHISTLER'S NEST WITH NARROW ENTRANCE.



FIG. 2. WHISTLER'S NEST WITH ROUND ENTRANCE.

her beak down to the ground or to the water, one after another being taken down until the whole brood is taken in safety from the elevated nesting place; and I have been assured by the peasants [of Lapland and Finland] that this always takes place in the dead of the night."

Wilson was told by a person who lived within twenty or thirty yards of a tree in which a pair of Wood Ducks had nested for four successive years that "he had seen the female, the spring preceding, carry down thirteen young, one by one, in less than ten minutes. She caught them in her bill by the wing or back of the neck, and landed them safely at the foot of the tree, whence she afterward led them to the water."

Audubon, in his justly celebrated account of the Wood Duck — one of the best and most complete bird biographies that has ever been written — says: "If the nest is placed immediately over the water, the young, the moment they are hatched, scramble to the mouth of the hole, launch into the air with their little wings and their feet spread out, and drop into their favorite element; but whenever their birthplace is at some distance from it, the mother carries them to it one by one in her bill, holding them so as not to injure their yet tender frame. On several occasions, however, when the hole was thirty, forty, or more yards from a bayou or other piece of water, I observed that the mother suffered the young to fall on the grasses and dried leaves beneath the tree, and afterwards led them directly to the nearest edge of the next pool or creek." (Birds of America, 1843, Vol. VI, p. 273.)

Mr. Fred Mather has contributed the following account of how young Wood Ducks, bred in captivity, leave the nest: "Some writers claim that the mother takes them in her bill and others say that she carries them on her back. I had a string of pens back of my house; a pair in each, for they are better to be separated, and usually I found the mother and her brood on the water in the morning; but on two occasions I saw them leave the nest. The mother went first to the pool and called; she had brooded them for twenty-four hours or more, and they were strong. Then one after another the little things climbed out of the box and tumbled to the ground, or to the water.

"They had to climb 4 to 6 in. of plain board, but they did it.

I have seen them climb a 10 in. base board and go through 1 in. poultry netting when alarmed. They weigh nothing worth mentioning, and they have claws as sharp as cambric needles. They have pricked my hands until they bled when pinioning them at eight weeks old. I can easily believe that they can climb up a hollow tree and drop 20 ft. into the grass without injury. What need of such sharp claws and climbing ability if not for leaving the nest?" (Forest and Stream, Vol. LII, March 18, 1899, p. 205.)

Audubon's assertion that the female Wood Duck occasionally carries her young in her bill is so brief and guarded in comparison with the remainder of the vividly written paragraph in which it occurs as to suggest that it may not have rested on his personal experience, while Wilson's account was confessedly, and Dresser's quite evidently, taken at second hand and on the evidence of obscure and untrained observers. It is by no means impossible, of course, that tree-nesting Ducks occasionally take their broods to the water in the manner described by these and other writers, but if this be so the fact remains to be definitely established.

During my first visit to the Whistler's nest this morning I removed one of the young and took it with me to the house-boat, intending to return it after breakfast. The sudden departure of the mother with the remainder of her brood frustrated this plan and I kept the pretty little creature for two days, glad of the opportunity to try a few experiments with a wild Duck which had never seen water. I first put it on the deck where it ran about freely, standing and moving in a nearly erect position, lying prone with half extended wings when tired. It frequently called *peep-peep-peep-peep-peep* in shrill, piping tones, much like a young Turkey. It did not appear to be either shy or apprehensive, but, like many young birds, it was exceedingly stubborn and wilful, giving me the greatest trouble to photograph it, absolutely refusing to remain where I posed it, although it would settle quietly enough almost anywhere else. I next put a shallow pan filled with water near it. It ran back and forth through the pan many times without taking the least apparent notice of the water.

Shortly after this it was placed suddenly but gently in a tub filled to the brim with water. For at least a minute it remained

floating in one spot, looking about with evident bewilderment, but seemingly without fear. Its feet and legs hung loosely down and were occasionally twitched slightly. Presently it began using them as paddles, slowly and hesitatingly at first, afterwards more confidently, although more than an hour passed before it learned to swim at all fast or vigorously.

When it had mastered this accomplishment it tried climbing over the edges of the tub. We then removed about half the water, but the little bird went up the sides almost as nimbly as a mouse, clinging with its tiny claws to the soft wet wood. By noon it had learned to leap ten or twelve inches straight upward either from the water or from the bottom of a box. The muscular power and vigor of its stout legs were indeed remarkable, and it seemed to get as firm resistance for an upward leap from the water as from the surface of a board. One of the first things it did on being placed in the tub was to begin picking up various small objects such as bits of bark or weed which were floating in the water. It apparently swallowed some of these fragments, but we were unable to find any food which it seemed to relish, although it was quite willing to try everything we offered it. It ate a very little egg yolk, and some wriggling fragments of earth worms excited it greatly at first, but after getting them well down its throat it ejected them with evident disgust. While engaged with them it dropped a piece which began sinking slowly. It at once thrust its head beneath the water and tried to catch the descending morsel. This was the nearest approach to diving that we saw it make. It drank often and copiously and bathed freely, afterwards preening and drying its downy plumage with great patience and thoroughness, using its bill like an old bird.

The following morning our little Whistler was alive but feeble and depressed. As it would eat nothing that we had to offer, we took it to the flooded forest and putting it on a piece of floating driftwood near the foot of the tree in which it had been hatched, backed the boat off a few yards and left it at freedom. It stood erect and motionless for a minute or two looking about; then entering the water began swimming, at first slowly and in evident bewilderment. But very soon it gained confidence and struck out more boldly until at the end of a few minutes it was

darting hither and thither, skimming the surface as lightly as a fluff of thistle down and in courses as erratic as those of the lucky bugs whose gambols it disturbed. Now it sipped the water eagerly, next picked at a floating leaf or darted after some small aquatic insect. Every now and then it would raise the forward part of its body and flap its tiny wings in the manner of an old Duck. The floating sticks and rafts of dirt that covered a large part of the surface did not embarrass its progress in the least, for it crossed them either by running or by a succession of short, quick leaps as nimble as those of a small frog. Poor little waif ! It was pathetic to see it start off thus alone and unprotected on its perilous journey of life, rejoicing evidently in its freedom and the novelty of its surroundings, but quite unconscious of the dangers which lay before it. I could only hope that one or the other of the female Whistlers which we started from the water near the nest tree would adopt and care for it, and I was glad to see one of them fly back to the spot after we had departed.

ECOLOGY OF THE MARYLAND YELLOW-THROAT, AND ITS RELATIVES.

BY WILLIAM PALMER.

FOR MANY years I have known that two distinct forms of this common species (*Geothlypis trichas*) occurred in Virginia ; a small summer resident and a larger, better colored transient. Within a few years past I have found a third, a large, rich colored summer resident of the cypress and cane swamps of the southeastern part of the State. A study of considerable material and experience has led me to results which may throw more light on the distribution and evolution of the genus.

The genus *Geothlypis* has no characters peculiar to itself ; it is differentiated from its near relatives by a combination of characters each of slight importance. It contains about 28 forms, dis-

8. Slight facial black, short wings, long tail, pale coloration, grayish dorsum ♀ without black. Subgenus *Chamæthlypis*. { *ralphi*, Northeastern Mexico.
poliocephala, Mexico.
palpebralis, Mexico.
caninucha, Guatemala.
icterotis, Costa Rica.
9. Short and broad facial black, slight slaty crown band, sexes nearly similar. { *formosa*¹, Southeastern U. S.

In groups 4, 5, 6 and 7 there is a sequence of structure and color values, largely geographical and not present in the other groups. Seemingly, group 8 continues the sequence from group 7. The intense, rich coloration of group 6 evidences the values of a moist tropical habitat. The short boreal summer residence of group 3 has hardly effected their color values. The habitats of all the groups except 8 and 9 do not overlap in summer, they rather meet and often intergrade. The ranges of 8 and 9 overlay the general habitats of some of the others, but the local environments are quite different. The differences between the forms do not always indicate a variation from a contiguous form, but rather a specialization from an ancestral generalized type through environmental influences.

In all the forms, except groups 3 and 9, the wings are well rounded, the outer primaries being quite short, the third or fourth being the longest. This is a character common to all non-migrating and especially sedentary tropical species. In *agilis* of group 3, the wing is long and pointed, the outer primary being as long as, or, in fully adult birds, slightly longer than the second. In *tolmiei* and *philadelphia* an intermediate stage is evident, and these are birds of fairly high altitudes with a long migration. As we pass southward and toward sea level in the habitats of these birds, we find that the outer primary decreases in length, thus, *brachidactyla* has a longer and more pointed wing than any of group 4, because it migrates further, it goes further north and south. As the birds of group 3 and 9 and *brachidactyla* of group 4, migrate more extensively than any others of the genus, it is evident that the long, pointed wing with a long outer primary, as compared with the short, well rounded wing and short outer primary of their slightly migrating or sedentary relatives, is an index

¹Subgenus *Oporornis*.

of the length and character of the migration, *and have been caused by migration.*

While the color values as here given (largely psychological characters) exist strongly in the males, many of the females show a tendency in the same direction. The females of *formosa* especially are very like the males and are thus further advanced in this species, but many of the older females of other species exhibit a tendency toward the marking and coloration of the males of their respective species. This is especially true of the more tropical forms. The strong color differences between the sexes of most of the forms are evidently derived from the superior activity of the male, plus the necessary secretive characteristics of the female. Where, however, the showing off habits of the males are slight, natural selection has permitted the females to acquire an almost similar plumage to the males, as in *formosa*. The subdued character of the song of this species, its secluded habitat and its ground habits have permitted the female to attain nearly similar plumage conditions and has retarded greater specialization of the male.

Judging from all the characters, the *fornsi* and *poliocephala* groups would seem to be the least specialized, while *occidentalis* and *brachidactyla* occupy the other extreme.

Another interesting feature is shown in the comparative lengths of the tails and wings, non-migratory lowland forms having relatively shorter wings and longer tails, while mountainous dwelling and high northern forms have relatively longer wings and shorter tails. These characters, dependent upon altitudinal and northern habitats, are less strong in the immature, but are attained by age and experience.

The white and slaty crown band of the *trichas* group changes in Mexico and lower California to a yellow band, which in Central America is entirely lost, the green of the back becoming greatly intensified and abruptly joining the facial black.

THE TRICHAS GROUP.

Their abundance, and the low bushy-ground nature of their habitat fit these birds to take advantage of general climatic

changes as geological influences have affected the topography, and, therefore, we might expect to find a great variation among the characters most likely to be affected. As these influences have acted gradually through a long series of years upon somewhat different material, it follows that results will be different, according to the distances between the geographical areas examined, because the influences are more dominant at one point than at some other. The forms here recognized and their values and distributions are as follows:

Geothlypis trichas AND SUBSPECIES.

Adult ♂ in spring: Above olivaceous brown, darker on wings and tail; beneath yellowish, stronger and brighter on throat, breast, and under tail-coverts; sides of breast olivaceous; forehead and face black, bordered posteriorly by ashy white; bill blackish, deeper than broad, tapering to a point; wings short and rounded, outer primary shorter than next; tail shorter than wing, well rounded; feet flesh colored; tarsus longer than midtoe, lateral toes nearly equal and as long as midtoe minus claw.

Adult ♀ in spring: Similar to male but smaller, less richly colored and without black; a faint loral stripe; ear-coverts darker than grayish face.

Immature and winter adults: Similar to summer specimens of the same sex, but with the face markings less strongly defined and less extensive; coloration richer with a browner dorsum.

The Subspecies.

Geothlypis trichas trichas. MARYLAND YELLOW-THROAT.

Turdus trichas LINNÆUS, Syst. Nat. ed. 12, 1776, 293. Type locality, Maryland.

Adult ♂ in summer: Smallest; above olivaceous, brownish on pileum; throat, breast and under tail-coverts lemon yellow; sides of breast grayish olive; facial black restricted, narrow on forehead; outer primary shorter than the 6th; wing, 50-54 mm.; tail, 48-52 mm.; culmen, 9-10 mm.; tarsus, 21-23 mm.

Adult ♀: Smaller than ♂, relatively stouter bill; yellow of throat paler, restricted, sometimes absent.

Geothlypis trichas roscoe. SOUTHERN YELLOW-THROAT.

Sylvia roscoe AUDUBON, Orn. Biog. I, 1831, 124, xxix. Type locality, Mississippi.

Geothlypis trichas roscoe HASBROUCK, Auk, VI, 1889, 167.

Geothlypis trichas ignota CHAPMAN, Auk, VII, 1890, 11. Type locality, Tarpon Springs, Florida.

Adult ♂ : Large, brownish above; breast strongly tinged with ochraceous; under tail-coverts ochraceous yellow; facial black broad, especially on forehead; outer primary shorter than the 8th; wing, 53-55 mm.; tail, 50-54 mm.; culmen, 10-12 mm.; tarsus, 21-22 mm.

Adult ♀ : Smaller, slightly larger bill, less strongly colored.

Geothlypis trichas brachidactyla. NORTHERN YELLOW-THROAT.

Trichas brachidactylus SWINSON,¹ Animals in Menagerie, Jan. 1, 1838, 295. Type locality, "Northern provinces of the United States."

Adult ♂ in summer: Similar to *trichas* but larger, with stouter bill and longer and more pointed wings; outer primary longer than the 6th; wing, 51-57 mm.; tail, 48-51 mm.; culmen, 11-12 mm.; tarsus 19-21 mm.

Adult ♀ : Similar to ♀ *trichas* but larger, with more pointed wing and longer outer primary.

Geothlypis trichas occidentalis. WESTERN YELLOW-THROAT.

Geothlypis trichas occidentalis BREWSTER, Bull. Nutt. Orn. C. 1883, 159.

Adult ♂ in summer : Largest; above pale olivaceous; throat, breast and under tail-coverts bright lemon yellow; facial black with a broad whitish crown band; forehead black, narrow; outer primary longer than the 6th; wing, 54-61; tail, 53-56; culmen, 10-11; tarsus, 19-21.

Adult ♀ : Smaller; less richly colored, especially on the throat and breast; sides of face pale grayish, pale eyering, grayish tinge across breast.

¹ "47. *Trichas brachidactylus*.

"Above, olive green; beneath, yellow: a black fillet enveloping the front, eyes, and ears, bordered above by cinereous white. Lateral toes nearly equal, and shorter than the hinder one.

"Inhabits plentifully, the Northern provinces of the United States."

Geothlypis trichas melanops. MEXICAN YELLOW-THROAT.

Geothlypis melanops BAIRD, Review Am. Birds, Smithsonian Miss. Colls. (181), 1865, 222. Type locality, Jalapa, Mexico.

Adult ♂, in summer: Large; above yellow olivaceous; beneath uniform rich yellow, ochraceous on the flanks; facial black with a broad whitish crown band, posteriorly margined with yellow; tail as long as or longer than the wing; wing, 62 mm.; tail, 61.5 mm.; exposed culmen, 12 mm.; tarsus, 22 mm. (type).

Adult ♀: Less strongly colored than the ♂; lores less ashy white; face and underbody pale yellow, whiter on the abdomen; sides of neck and breast pale reddish brown.

Distribution in Summer.

Florida and the seaward edge of the Coastal Plain from Chesapeake Bay into Texas; inhabits the cypress, cane and palmetto regions. Floridian *roscoe*.

The Coastal Plain and Piedmont Plateau regions from southern New England to Chesapeake Bay, thence including the bases of the mountains into Georgia and the Mississippi Valley from near sea level to about 1000 feet. Carolinian *trichas*.

New England, northward and eastward into Newfoundland, and near Hudson Bay. Transition and Canadian *brachidactyla*.

Western United States from about the 97th meridian to the Pacific, and from northern Mexico into British America. Generally between 2000 and 6000 feet. Sonoran and transition *occidentalis*.

Eastern Mexico, probably below the eastern edge of the plateau. *melanops*.

Distribution in Winter.

Practically resident, except at its more northern habitat . . . *roscoe*.

Southern Atlantic slope birds, wintering largely if not entirely in the southern States; the more northern and the intermediates migrating to the Bahamas and the West Indies; the Mississippi Valley birds into Mexico and Central America *trichas*.

Along the Atlantic coast through the Bahamas to the West Indies, and perhaps further *brachidactyla*.

California and southern tier of States into Central America and Lower California *occidentalis*.

Into southern Mexico *melanops*.

Comparative Areas of the Habitats.

The following figures are only approximate, but are well within the truth. They illustrate only the breeding range of the respective forms.

East of the Appalachians, 1000×150 miles = 150,000 square miles, plus Mississippi Valley area, 800×700 miles = 560,000 square miles. Total, 710,000 square miles. General elevation, 50 to 1000 feet. *trichas*.

A coastwise strip about $2,000 \times 25$ miles = 50,000 square miles. General elevation, less than 50 feet *roscoe*.

Practically an area 600×500 miles = 300,000 square miles. General elevation, northern sea level to 1,000 feet *brachidactyla*.

An area 1200×1200 miles = 1,440,000 square miles. General elevation, almost entirely above 2,000 feet *occidentalis*.

Area and elevation not known *melanops*.

The areas here given total 2,500,000 out of the 3,500,000 square miles of southern British America and the United States. Contrasted with this immense area, with but four forms of *trichas* and four other species, we have in Central America, with but 950,000 square miles, at least 17 forms; an instance of the greater wealth of a tropical habitat.

The extension of the range of *roscoe* to Chesapeake Bay is based on my collection of the bird (June 1896-7-9) in the Dismal Swamp, where it is quite abundant in the cane (*Arundinaria tecta* and *macrosperma*) and the cypress (*Taxodium distichum*). In 1898 Mr. R. G. Paine, at my request, sought for Yellow-throats in the vicinity of Charleston, South Carolina. He found two, and took a specimen on November 1 in St. Andrew's Parish. It is an immature *roscoe*. Wilson has the following to say, undoubtedly of this bird:¹ "I found several of them round Wilmington, North Carolina, in the month of January [1809] along the margin of the river, and by the cypress swamp on the opposite side." It is doubtful if this form occurs far from the coast, certainly not above the 100-foot contour.

A specimen is in the Biological Survey collection taken by Wm.

¹ Am. Orn., II, 1810, 163.

Lloyd on East Caranchus Creek, Jackson County, Texas, Jan. 6, 1892. Another is in the National Museum collection taken by Dr. Shufeldt at New Orleans Nov. 26, 1882 (No. 90665). Audubon's specimen was taken in a deep cypress swamp in September, 1821, "not far from the river Mississippi, in the State bearing the same name."

Comparative Ecological Values of the Habitats.

Large amount of sunshine, great radiation, temperate climate and vegetation, perfect and rapid drainage, open and generally dry soil conditions, low to medium elevation, short to fair migration . . . *trichas*.

Fair amount of sunshine but tempered by insular characteristics, copious moisture, slow radiation, subtropical climate and vegetation, deep shade, slow drainage, low elevation, practically no migration.

roscoe.

Fair amount of sunshine tempered by sea and boreal characteristics, slow radiation, subboreal climate and vegetation, good drainage, generally damp soil conditions, low elevation, extensive migration into a tropical climate *brachidactyla*.

Excessive sunshine tempered by altitudinal characteristics, excessive quick radiation, partial desert climate and vegetation, generally poor and arid soil conditions, high elevation, fair migration into subtropical climate. *occidentalis*.

Subtropical habitat, otherwise unknown *melanops*.

Nomenclature.

As the first form of this species to be described binomially was the Maryland bird it becomes the type from which to differentiate others. The northern bird has not heretofore been separated except by Swainson, who evidently considered it distinct from the Maryland bird, for which he had substituted the name *Trichas personatus*.¹

Mr. C. J. Maynard has described a specimen taken on February 2, 1884, at Nassau, New Providence Island, Bahamas, as a

¹Zool. Journ. III. 1827, 167.

new species.¹ I have, through the kindness of Mr. G. S. Miller, Jr., to whom it belongs, examined the type. It is a midwinter immature *trichas-brachidactyla*, more nearly the latter, and probably from about New Jersey, Mr. Maynard's familiarity with the large New England bird and non-familiarity with the small Maryland bird, causing him not unnaturally to describe the stranger as new. (See Bónhote, *Ibis*, 1899, p. 510.)

I have accepted Audubon's name for the southern bird. There can be no question as to the Florida bird occurring along the Gulf coast, and therefore his bird, readily distinguishable when collected, though afterwards placed with *trichas*, should be given proper rank. As the bird was taken in a cypress swamp it renders this view more probable. The mistake of Dr. Hasbrouck occurred through assuming that a lowland resident Florida bird should also occur far up the Mississippi valley unchanged.

Mr. Oberholser's *arizela*² is based on extremely slight characters, but chiefly on 'geographical reasoning.' In the lowlands of the west occur smaller individuals than are to be found at higher altitudes close by. The birds of the Great Plains are intermediate in size between *occidentalis* and *trichas*, as are also more northern individuals. It is altitude that fixes the greater size of the large specimens of *occidentalis*, a fact evidenced by many other species. Wearing changes the coloration of the feathering in these birds to such a great extent that it seems unfortunate to base color values on summer specimens which acquired their plumage early in the previous autumn. The type of *arizela* is unfortunately an old and badly made skin. The greater yellowness, both above and below, of lowland and more southern California specimens is due to an approach toward influences which have produced *beldingi* and *melanops*.

¹ "LITTLE BAHAMA YELLOW THROAT. *Geothlypis restricta*. — Above, dark olive green with space next to black abruptly ashy, mark restricted on the cheeks to about the same width as on the forehead, beneath, light yellow becoming lighter on abdomen and brownish on sides; wings shorter and rounder than in the common *trichas*; dimensions, wing, 2.40; bill, 23; tarsus, 25. Occurs in Bahamas." — *The American Exchange and Mart*, Feb. 5, 1887, 69.

² *Auk*, 1899, 257.

Differences.

The differences between typical specimens of the three eastern forms are quite strong. True *trichas* (Maryland) is a very small bird with a slender, short bill, restricted black facial area and pale colors in spring. It has a short, well-rounded wing in which there is little difference between the 3rd, 4th and 5th primaries, while the 1st is decidedly much shorter than the 6th. The formula¹ of length is usually 3-4-2-5-6-1-7-8, sometimes 4-3-5-2-6-1-7-8, rarely 4-5-3-2-6-1-7-8. In immature birds and in the most unworn spring specimens the formula is 4-3-5-2-6-7-1-8, the differences between the 1st and 7th being slight. The inner primaries wear faster than the outer, being weaker. Spring specimens taken about Washington, D. C., are always well worn and pale, contrasting strongly with the less worn and brighter specimens of *brachidactyla* taken at the same time and place. Nine spring males range in size: wings, 50-54 mm.; tails, 48.5-52 mm.; culmens, 9-10 mm.; tarsi, 21-23 mm. Ten females: wings, 47-51 mm.; tails, 46-48.5 mm.; culmens, 9.5-11 mm.; tarsi, 19-21 mm. The females sometimes lack entirely the yellow of the throat and breast which is never as extensive and as strong as in the other forms.

In its well rounded wing *roscoe* agrees with *trichas* but difference in length of the feathers makes a different formula. The 3rd, 4th and 5th are nearly equal, and a slightly wider interval separates the 2nd and 3rd, while the 1st is considerably shorter than the 2nd, as in *trichas*. But the inner primaries are longer, so that the formula is 4-5-3-2-6-7-8-1. Wearing takes place more rapidly on the inner primaries so as to result in the usual formula on worn individuals of 4-3-5-2-6-1-7-8. It is a much larger bird with a longer, stouter bill and tail, and a strong brownish tinge even in worn summer specimens. The wide forehead black and the ochraceous tinge of the yellow of the underparts are characteristic of this form. Thus *trichas* and *roscoe* agree well in the wing pattern but differ greatly in size and color.

¹ The outermost primary is here for convenience considered the first: the first number represents the longest feather, the last the shortest.

Dr. Shufeldt's New Orleans specimen, an adult male, is in fine unworn plumage and has much less ochraceous beneath than is usual in eastern specimens; it measures, wing, 56.5; tail, 55; culmen, 13; tarsus, 23. Its wing formula is 4-3-5-2-6-1-7-8.

Lloyd's Texas specimen is the palest example I have seen; its bill, though long, is rather slender, and though in good plumage it has much less brownish and ochraceous than in eastern specimens. It measures, wing, 55; tail, 56; culmen, 11.5; tarsus, 22.

Its tail is thus a trifle longer than the wing, the only instance in the species. The wing formula is 4-3-2-5-1-6-7-8.

An immature specimen from near Charleston, S. C., Nov. 1, 1898, in unworn condition, measures, wing, 55.5; tail, 52; culmen, 10.5; tarsus, 21.5.

The northern bird resembles *trichas* in color, but comparable spring specimens are deeper and better colored, which is also the case with autumn specimens. Wearing produces similar effects as in the other form, so that summer specimens of both are quite similar except in size and wing outline. In *brachidactyla* we have a larger bird with a much stouter bill, longer wing and relatively shorter tail. The wing is less rounded, a greater interval separating the 4th and 5th primaries and a less interval the 2nd and 3rd, and the 1st and 2nd. This results in a longer outer primary and in its being next to the 5th in length, sometimes it follows the 4th. It is always longer than the 6th, not shorter as in the other forms. The formula is almost without exception 4-3-2-5-1-6-7-8. A variation is 4-3-5-2-1-6-7-8, another 3-4-5-2-6-1-7-8, but these are rare and are evidently due to wearing, occurring on spring specimens. Specimens taken in Virginia near Washington in spring measure, males, wings, 52-55; tails, 48-51; culmens, 11-12; tarsi, 20-21. Females, wings, 51-54; tails, 46-47.5; culmens, 11-11.5; tarsi, 17-18. In a series of Long Island May specimens the wings are 54-57; tails, 49.5-52.5. New England and Canada spring specimens are: wings, 55.5-57.5; tails, 49.5-53. Spring male specimens from the Bahamas: wings, 54-59; tails, 50-55.5. A series from the mountains of western Pennsylvania in summer: wings, 48-57.5; tails, 44-52. The largest *trichas* that I have seen from about Washington has a wing of 54, while the average is much less. A series of New York city autumnal

males give, wings, 54-59; females, wings, 53-56.5. These and numerous others show that the size increases northwards, also the length of the outer primary. In Pennsylvania in the same latitude, different sized birds are found on opposite sides of the mountain divide, the larger, curiously enough, occurring at a generally lower elevation on the western side. The cause is explained under migration. The females of all the forms are smaller than the males of its subspecies and, except in *brachidactyla* and *occidentalis*, have relatively stouter bills.

The western bird, *occidentalis*, is a little larger than *brachidactyla*, but grayer in dorsal coloration with a broad white posterior edging of the facial black. The yellow of the throat is more intense and the black of the forehead is relatively narrower. Freshly molted adult birds are but slightly paler dorsally than eastern birds, but immature birds are fully as dark and as brown above as in similar aged eastern birds. The females in summer are as a rule less yellowish and paler than eastern birds. A few have decidedly yellow throats but it is far from the rule. The immature females are browner and duller above and beneath with a much browner tinge across the breast than in either *trichas* or *brachidactyla*. As a rule the 4th primary is slightly the longest, but wearing in many cases soon makes the 3rd the longest, and sometimes the 3rd is the longest in immature birds. The wing formula is usually 4-3-2-5-1-6-7-8; rarely the 6th is longer than the 1st, and sometimes the 5th is slightly longer than the 2nd; wearing reduces the inner primaries so that the formula becomes 3-4-2-5-6-1-7-8 or 3-4-2-5-1-6-7-8.

Melanops differs from the other forms in having a yellow border to the ashy crown band,¹ an indication of the more tropical forms *beldingi*, *flaviceps* and *flavovelata*. The type is the only one that I have seen. It is in partially worn plumage, the yellow bordering the crown band being almost completely obscured by brown tips to the feathers. If the tail was unworn it would undoubtedly exceed the wing in length. This bird differs from *occidentalis* by its shorter outer primaries, longer and larger tail and feet, and the

¹ All the *trichas* group have a trace of yellow back of the ear-coverts in many specimens, but in this form the yellow is well developed.

more extensive yellow of the underparts and dorsum. The type has a wing formula of 4-3-5-2-6-1-7-8, with the widest space between the 5th and 6th. The 6th is of course more worn.

Except in *formosa* the females of all the forms are quite different from the males in coloration. The presence of an interrupted eyering in the females of the *trichas* group is also found in the males of some of the *agilis* and *poliocephala* groups, an evidence of their incomplete or imperfect evolution. This eyering is absent or slight in the more tropical forms. Its occurrence in young males indicates a step in their evolutionary change from the ancestral form.

In *melanops* we have an approach to the Mexican and Central American species in which the ashy crown band is absent and replaced by a yellow band or by the green of the dorsum. It is truly an intermediate between the highly specialized *trichas* type and the lower but more brilliant *subflava* type, the transition occurring on the one hand through *flavovelata* and *bairdi* and on the other through *occidentalis* and perhaps *roscoe*. *Beldingi* is another extreme of the *flavovelata* and *flaviceps* type.

The differences here presented are zoögeographical. As the food of males and females is probably similar we have no clue there to the causes that have brought about such a contrast between the sexes. Why then have they differed and why in *formosa* are they so alike? *Formosa* differs from the others in the character of the songs of the males. It is a simple warble, not the outpouring burst of the *trichas* type. The vivacity and more active life of the males of this last species and their great song powers have seemingly led to an accentuation of pigment on the forward part of the body. It would seem that there is some element in their food taken in the damp shady retreats of their habitats which in combination with their active, songful life has permitted this accentuation of pigment. Natural selection by permitting, as a rule, the most striking and hence the most active and enduring, to propagate, not by any selective ability of the females, but by the greater vigor and persistence of the males, has slowly evolved the strong characters of the males. Boreal influences and a long migration have prevented the *agilis* group from progressing to the same extent as in *trichas*.

The northern birds have short secondaries while the non-migratory and especially the lowland birds have long secondaries.

Causes of the Differences.

Freshly molted autumnal specimens of the four United States forms are not greatly unlike in color, but *roscoe* is the richest and deepest colored. These richer and browner colors are evidently due to its moisture, lowland, semi-tropical habitat, while its size and well-rounded wing are evidence of its non-migratory habit, its practically insular home and abundant and easily obtained food. It is a rather shy, retiring bird not easily coaxed from its leafy retreats. It inhabits a region of the least relative radiation and is not a sun-loving bird.

The smaller, paler *trichas* is at home in summer about the marshes and low places of the Coastal Plain and Piedmont Plateau, where it is exposed to more sunlight, less rich and generally drier conditions. The shortness of its migration accounts for its similarity in wing contour to *roscoe*. It inhabits a region of great relative radiation of heat and moisture, rendered stronger by the effects of civilization upon forest growths, the bird having undoubtedly greatly extended its range as the country became deforested, as for instance in the mountains of Pennsylvania up to 3000 feet. It greatly enjoys sunlight. In winter it seeks as nearly as possible similar conditions. Its very close relative, too near perhaps to be subspecifically separated, the Mississippi Valley bird, is, in comparable specimens, more highly colored and often larger. It inhabits a moister and richer region and its winter residence in Mexico and Central America causes a longer migration, hence its longer wing and greater size. The usually greater extent of yellow on the under body as compared with eastern specimens shows less wearing and consequently the less harsh character of both its winter and summer habitats. Specimens of *trichas* that I took in Chotank Creek marsh, King George County, Virginia, in July, 1898, had the yellow of the throat extending to a point down the centre of the under body, while the sides are even more worn than in ordinary birds.

This was caused by the bird's habit of perching on the long inclining leaves of wire-grass abundant in the marsh, bushes and twigs being uncommon. Alternate contact of the sides of the body with the grass wears the yellow tips of the feathers leaving the centre of the body almost untouched. The constant perching of most individuals of *trichas* and *brachidactyla* on generally horizontal twigs produces the same effect but evenly up to the breast. The Mississippi Valley birds, owing to the less harsh character of the vegetation mainly of the winter habitat, have in comparable specimens less of the yellow worn off than occurs in eastern birds. Some examples are, however, identical in wearing with these two preceding forms.

The more boreal habitat of *brachidactyla* and its consequently much longer migration accounts for its greater size, its longer wing and longer outer primary. The relatively less radiating power of its northern home, with a diminished amount of sunlight, has also assisted, besides the more tropical character of its winter home. Spring and summer specimens from the southern portion of its range are paler and more bleached than in more northern examples of even date. The more northern birds are also more shy and more difficult to secure.

In *occidentalis* the 4th primary is often longer than the next on either side, the 3rd, 2d and 1st graduating quite evenly in a manner not seen in true *trichas*. In the Mississippi Valley a less pronounced similarity is evident on birds from the western portion of the valley; but to the northeastward the outward primaries become longer and the wing contour merges into the typical of *brachidactyla*. The great elevation of the habitat of *occidentalis*, from 2000 feet up, has produced its greater size. Its practically short migration permits it to retain the ancestral wing contour; but in the more northern birds and those of the Plains the 3rd primary is often the longest, and the wings are slightly more pointed.

In *melanops* we have a richer colored and yellower bird, due undoubtedly to its more tropical habitat, as shown in all the southern forms. Food is of course the prime factor in determining the amount and character of the pigment of these feathers, but we have little evidence as to its precise relation to color values.

The longer tails of the most southern specimens of *roscoe*, and of *melanops*, point to a sub-tropical and almost sedentary life; while the shorter tails and longer wings of far northern birds show results due to migration.

Intergrades.

The first Yellow-throats to appear about Washington in the spring migration are true *trichas*, later larger birds appear, the latest migrants being *brachidactyla*. During August *trichas*, both adult and young, move southward and gradually are replaced by larger birds, so that by September 1 the summer residents have wholly disappeared and a larger intermediate lot of birds are abundant, especially about the marshes. These are followed during the month by still larger birds with longer wings and longer outer primaries, so that October specimens are almost always typical *brachidactyla*. The proportion of good *brachidactyla* is much less than of *trichas* or of intermediates, as the latter loiter on the southward journey, while the former with a much longer journey in view make fewer stops. Their main bulk, however, journey coastwise. Specimens from the vicinity of New York and Long Island, while not perfectly typical *brachidactyla*, are constantly so different from typical *trichas* as to be placed with the former.

About Washington true *trichas* frequents the roadsides, the marshes and small low bushy places on the hillsides. The intermediates almost entirely frequent the marshes, while the larger *brachidactyla* nearly always is found in ravines and along streams in the deep woods.

The Mississippi Valley bird really is an intermediate, nearer *trichas* in the middle and eastern areas of the valley, nearer *brachidactyla* northward and northeastward, while along the eastern edge of the plains it merges into *occidentalis*; this result having been most evidently produced by the gradual disappearance of the Mississippi Sea.

The birds of the Dismal Swamp are not quite typical *roscoe*, but decidedly are not *trichas*. The birds of Virginia Beach, east of Norfolk, are similar. On the opposite shores of Chesapeake

Bay only *trichas* is found. At Smith's Island the summer residents are rather large *trichas* and quite unlike those from Virginia Beach which is but 20 miles across the mouth of Chesapeake Bay. Intergradation must occur through the region about the mouth of the James River, in fact specimens from near Suffolk, just outside the Dismal Swamp, are less like *roscoe* than those in the swamp.

Occidentalis presents some variation in the direction of other forms. The birds of the great California and Rio Grande valleys are greener above and have the sides of the body more extensively yellow than in other examples. These lowland individuals trend in the direction of *melanops*.

The differences between *occidentalis* and *melanops* are blended in an adult male taken by Dr. E. A. Mearns at Fort Hancock, Texas, June 13, 1893, which is undoubtedly a geographical intergrade (No. 134393 U. S. N. M. Coll.). In this specimen the wing is 58 mm.; tail, 54 mm.; culmen, 11 mm.; tarsus, 22 mm.

There is much yellow mixed with the worn white crown band, and its appearance readily suggests both *occidentalis* and *melanops*.

Variations.

"Individual variation" as usually understood and spoken of is simply a phrase to denote our ignorance of the precise relations of individuals to their environment, their ecology. It also generally covers differences of age. As I have shown, most of the differences in the species *trichas* are purely zoögeographical, a result of their peculiar and positive relation to their environment, both in summer and winter, in fact the various forms are products of their own peculiar environments. There is little true individual variation, that is, variation from the average in the same locality. A few specimens, here and there, of *trichas* have a wider and whiter area of ashy on the head. This is simply due to a wider absence of a maximum amount of pigment in the growing feather, caused probably by a local lesion or lapse of pigment (= equal food change) while the feathers were growing. Sometimes a male shows a lightening of the yellow of the throat, but such specimens are rare. More variation is noticeable in the females of *trichas*, less so in *brachidactyla*, a few being entirely destitute of

yellow, others having but a trace. A female from Smith's Island shows strongly the outline of the black and ashy of the male, especially on the forehead. In some immature fall male specimens the black and ashy is either greatly restricted or nearly obscured by brown tips to the feathers; in others the reverse is the case. The difference is doubtless caused by the former being from late broods, the latter from early ones. As a rule the personality of these birds is so strong that the environing influences are unable to allow variation except in geographical directions.

Migration.

The large but well rounded wing of *roscoe*, with its short outer primary, and its known winter distribution, shows that it practically is a resident where found. It evidently entirely withdraws from Virginia in winter, but occurs in that season as far north at least as the central coast district of North Carolina. The very similar wing contour of true *trichas* shows that its migratory journey is not extensive, probably few, if any, leaving the United States. The longer wing and longer outer primaries of the Mississippi Valley birds and their known winter home, shows that their journey is longer, which is also the case in a greater degree with the northern form *brachidactyla*. The following is interesting in this connection. A large series of summer specimens from the mountains of Western Pennsylvania were kindly placed at my disposal by Mr. W. E. Clyde Todd. Upon measuring them, it developed that they could readily be placed according to size in two groups, this being independent of altitude. Distributing these specimens on a map according to localities, it became apparent that the larger birds came from the most western portion of the State, the plateau region, while the group of smaller birds came from the mountains eastward of the divide. The drainage of the plateau is toward the Mississippi, while the mountain area is drained by streams which flow southeastward into the Susquehanna and then into Chesapeake Bay. It is apparent, therefore, that the small birds, almost typical *trichas*, reached their mountain summer home from the southeast by way of the river valleys, while the larger birds of the plateau came

from the southwestward and traveled a much greater distance in going to and from their winter habitat in Mexico and Central America. Thus birds of the same subspecies occurring in the same latitude at the same or a different elevation and in adjoining counties, are divisible into two groups according to size, the difference being due to the contrast in the length and direction of their migrations. This result is peculiar and interesting, and in line with the already known fact that many eastern Mississippi Valley migrants reach New York State, and pass even further east.

The eastern trend of the Atlantic coast line is an important factor in the migration of *brachidactyla*. Twenty-six spring specimens collected in the Bahamas by the naturalists of the U. S. Fish Commission Steamer 'Albatross' are true *brachidactyla*, though somewhat darkened and weathered. They undoubtedly were on their way to northern New England, Nova Scotia, or Newfoundland.

While on Smith's Island, Virginia, in May, 1898, I saw some three dozen Yellow-throats which, with other birds, had struck the lighthouse ten days previously. They all were *brachidactyla* and mostly males. Several struck the lighthouse on the evening of May 21, and I secured three females; they were the same form. The resident birds on the island, which are abundant and slightly larger than typical *trichas*, were all paired and breeding at the time.

Maryland Yellow-throats are frequently mentioned by writers as being abundant during migrations at lighthouses along the coast; they of course are *brachidactyla*. This and the occurrence of the form in abundance during migrations in the Bahamas readily suggests the idea that the migration course is almost if not entirely southward in the autumn; that birds bred in New England and eastward migrate toward the coast and thence over the sea through the Bahamas to the West Indies.

This suggests the probability of a former narrower separation of the islands from the continent.

The birds of the Mississippi drainage area are larger as we go northward but do not attain the pointed wing and long outer primary characteristic of typical *brachidactyla*. The western bird,

occidentalis, migrates comparatively little except along its northern habitat. The birds which summer at a high altitude evidently simply descend to lower stations along our southern borders, where they spend the winter in favorable situations. Migration evidently has little effect on their feather growth, their size being due to the generally high elevation of the summer habitat, a truth shown in many other species.

Little is known of the movements of *melanops*, but there would seem to be little difference from *occidentalis*; its richer coloration implies a more southern and less boreal habitat.

The effects of a long migration are well shown in other species of *Geothlypis* in North America.

In *G. agilis*, the most northern breeder and probably also the most southern in its winter habitat, we have the largest form, and the outer primary (on immature birds the 2nd) is the longest, the others graduating to the innermost. In *G. philadelphia* and *G. tolmiei*, more southern yet high ground breeders, the wing is slightly more rounded, the 3rd, sometimes the 2nd, being the longest; the bill is smaller than in *agilis* and the bird is smaller.

In *G. formosa* there is little difference in the lengths of the three outer primaries; but the outermost is always slightly the shorter, the longer being usually the 2nd. Their migration is less extensive than those given above.

As the more southern and therefore more tropical forms do not migrate extensively we find in consequence a more rounded wing with short outer primaries, the fourth (often the third when the feathers are worn) being the longest. It seems evident then that the comparative lengths of the wings, and especially of the outer primaries and the secondaries, are an index of the comparative length or absence of migration in the respective forms. The comparative differences of size, length of wing, primaries and tails are in this genus simply effects of latitudinal and altitudinal habitats modified when necessary by insular characteristics, or length, character, or absence of migration, hence more of sub-specific or specific than of generic or subgeneric values. According to this view a genus *Oporornis* does not exist.

The Molt of the Adult.

In the new autumnal plumage all of the *trichas* group are distinguished by a richness that they do not possess in spring. The dorsum is decidedly brownish, and the ashy of the head is obscured by brown tips, the black by ashy and brown. These tips wear off during the autumn and winter and much of the brownish also, so that the width of the ashy and black areas are increased and the color intensified by wearing. The dorsal brown is worn off, slightly in *roscoe*, much more in *brachidactyla*, and usually almost entirely in *trichas*. A few spring *trichas* retain this brown to some extent on the pileum. There is a spring molt of the throat feathers, also of the facial black, but this last may not be complete. The fall molt takes place while the birds are moving slowly southward; the spring molt evidently occurs before they start northwards. The female does not molt in spring.

The Molt of the Immature.

As soon as the young is capable of obtaining its own food, it begins to change its nestling (mesoptile) plumage. This is effected rather slowly. First a few yellow feathers appear on the sides of the breast and then on the sides of the throat. Green feathers next appear on the back and scapulars, the body being first covered with the new feathers. In the male blackish feathers then appear under the eyes back of the gape, and brownish feathers on the top of the head, thence the change rapidly continues, the tertials, wing- and tail-coverts changing while the head changes. When the birds complete this stage they start on their southward journey (at least about Washington), so that it is difficult to follow further changes, but there is no doubt that the change continues and includes the wings and tail. No. 3203, August 14, 1893, W. P. collection, is an immature male *trichas* that has nearly completed the molt; the four outer primaries are of various lengths of growth, the inner all having been changed. This is similar to the change in the adults and at once shows how

the length and character of the migration can influence the growth of these feathers, greater wing power having developed and found expression in longer outer primaries as the length of the migration journey gradually increased in the individuals subject to the change. The three outer tail-feathers of this specimen on one side, four on the other, are still in place, but the central ones have dropped out and new ones are growing. A female, No. 3503, August 10, 1894, is in somewhat similar condition, the outer primaries are further advanced and the outer new tail-feathers are of differing lengths. The body change is nearly complete. Other specimens show similar changes, commencing about the middle of July and completed by the middle of August. This molting takes place all along the Atlantic watershed about the same time, but the birds of any given locality move further south before it is completed. It would seem that the night flights begin when the wing molt is fully completed.

A spring molt undoubtedly occurs, especially in the males, but it is confined to the face and throat. The yellow of the throat and most if not all of the immature facial black and the white eyering is replaced, so that the immature spring bird is hardly distinguishable from an adult. No spring molt appears evident on female specimens. Occasionally a male specimen is taken in spring which has not had a spring molt. I have taken several about Washington and have seen others. Immature birds of all the forms have slightly shorter wings and primaries during their second summer.

The high and arid character of the habitat of *occidentalis* accounts for the paleness of spring, summer, and most winter specimens, but the darkness of freshly molted birds tells a different tale. As already stated, the immature when freshly molted are as dark as eastern birds and the adults are scarcely less so. But a paling of the plumage rapidly takes place, being entirely caused by the bleaching action of the dry, clear, western atmosphere. The white feathers bordering the facial black are at first ashy, but little paler than in eastern birds, but they soon bleach even before they have fully grown, except where, as in immature birds, they are protected by brownish tips. This darker coloration of freshly molted birds is an index of the char-

acter of the local habitat. These birds inhabit bushy moist situations, where they obtain their food near or on the ground, so that it is not remarkable that the effects of a generally prevailing arid climate should counteract purely local pigment effects. Thus paleness in this bird is largely a mechanical effect due to climate and wearing. There is a constant struggle between the effects of a local, rich, moist land diet, which alone produces the pigment, and the high and generally arid climate which has many months in which to effect a bleaching change.

CONCLUSIONS.

The evidence shows that the Yellow-throats of the Eastern States can be readily segregated into three well marked subspecies, each occupying topographically, geologically and climatologically distinct faunal areas of enormous extent, and that each one is the product of its own peculiar environment plus in one case the effects of a long migration. The comparatively recent, geologically speaking, retreat of the glacial snow and ice has permitted, slowly to be sure but steadily, the evolution of *brachidactyla* from its preglacial short-winged ancestor. This has been effected not by the extension of the range of a species or even a subspecies but by the slow increase of the more northern individuals as the retreating snow and ice opened up a greater extent northward of possible breeding range. Concomitant with this increase of individuals in one direction occurred also a change of structure and character, the change being in an ascending ratio as a more northern point was reached each year or cycle of years. The result was a constantly increasing difference, the birth of a subspecies. Therefore, like so many other North American birds, *brachidactyla* is a result of a decrease of glacial ice and snow. We have then along approximately the same longitude three distinct forms of one species with two sets of intermediates. At one end the form is large because the individuals obey the well known law, that: *where a species occupies a longitudinal or altitudinal range the more boreal individuals are larger than their relatives of adjoining lower ground habitat.*

At the southern end the form is also a large one because the individuals obey the law, that: *where a species occupies a range one end of which is a low, tropical or island area, then the individuals occupying this portion are larger than those occupying an adjoining dissimilar habitat.* The result may be a species or subspecies differing from the parent stock according as the separation is long, or the environing influences are intense or weak. In the case of *brachidactyla* migration has intensified the divergence by compelling a longer wing, a process still in progress. The lapse of time since the glacial retreat has not been sufficient to make the outer quill the longest but such is evidently the tendency. In *agilis* we have a species which evidently occupies largely what was an island area in preglacial or interglacial times, and the development of the wing was hastened by the birds having to migrate over, or by, a Mississippi Sea.¹ In *tolmiei* and *philadelphia* we have two slightly differing species, evidently two divergents from a common stock; divergent because they extended their range northward on opposite sides of the Mississippi Sea. It would seem also that in *trichas* and all its eastern relatives we have one branch, and in *melanops* and *occidentalis* another, long separated by the same cause. The retreat of the ice has permitted the forms to be localized where we now know them, and as the Mississippi Sea disappeared *trichas* and *occidentalis* approached each other and have apparently insensibly intergraded. A similar case is the Meadowlarks which have joined habitats during the historical period.

It will have been noticed that the ranges of the three forms of *trichas* on the Atlantic slope are quite peculiar. Considered latitudinally the range of *roscoe* ends where *trichas* is in its prime, and in its turn this gives way to *brachidactyla*. The reason is evident, they occupy different faunal areas, the characteristics of which are determined by altitude, the slope angle and the character of the drainage. The width of the faunal area and the char-

¹ The former presence of this sea is indisputable and its effects on the distribution of North American bird life have hardly been noticed, yet it divided it into two parts, usually with representatives on each side. The life of the parts have approached each other as the sea disappeared and at the same time southern forms have moved northward.

acter of the topography, geology and vegetation are important factors. The Mississippi Valley bird is like true *trichas* because it occupies similar altitudinal and geological territory; it is unlike *trichas* mainly because its winter habitat is different and is at a greater distance. The latter influence is the slightest and permits us to retain the bird in the same subspecies, but further northwards and especially northeastwards, the other influence becomes stronger and a different subspecies is the result. The best examples of *brachidactyla* are from the Atlantic coast, because there the birds make a sea journey and evidently specialized quicker because of their comparatively narrow habitat during the glacial retreat; the broader area of the Mississippi region and the lake barriers having delayed the development of the birds northward. The migration of *brachidactyla* through the Bahamas proves that this group of islands was formerly less widely separated from the continent.

In my study of these birds, I have been unable to consider temperature as an important factor in producing differential characters. The strong psychological characters cannot be accepted as caused by temperature, for they are almost entirely absent in the females. The physiological characters are necessarily to be correlated with other more direct influences, many of which I have indicated. One effect of temperature has been to permit of a larger number of forms in the tropics, but only indirectly by its influence on other life and in connection with other causes in affecting the topography. Northward few species are found, but they are strikingly different even in the same temperature areas. Temperature acts principally as a barrier in preventing, along the northern and higher borders of the ranges of these birds, favoring topographical conditions. If our present arctic zone was to disappear, these birds would gradually work northwards and eventually, if favorable conditions continued for a long period, would break up into various forms under the influence of local conditions; but they would never have the short rounded wings of their tropical relatives unless their migration should wholly cease.

The genus *Geothlypis* is purely Nearctic wherever it is found, and undoubtedly developed in North America during preglacial

times. Its presence south of the United States is due to former glacial influences, and it is evident that such forms are the lowest and most generalized. The *trichas* group represents its highest development.

I would extend the present accepted southern limit of the Nearctic subregion to include nearly all of the West Indies, Central and South America, and consider its life as an invasion and overlaying of the Neotropical region consequent upon the effects of a glacial period. Neotropical life now barely reaches the United States. Present winter North American life represents a transition between the original Palæarctic, from which it has been derived, and the pure Nearctic, an earlier result, of which *Geothlypis* is an example.

My indebtedness to the collections of the National Museum and the Biological Survey is gratefully acknowledged.

NOTES ON A FEW SPECIES OF IDAHO AND WASHINGTON BIRDS.

BY JOHN O. SNYDER.

DURING the year 1894 the following notes were made in northern Idaho and Washington. Specimens of each species mentioned were taken and preserved. The localities visited were Kaniksu Lake, Blue Lake, Hoodoo Lake, and Spirit Lake in Kootenai Co., Idaho; Diamond Lake in Stevens Co., Mt. Carleton in Spokane Co., and Pullman in Whitman Co., Washington.

1. *Merganser americanus*. AMERICAN MERGANSER.—Several females with young observed at Diamond Lake, where downy young were taken, June 21.

2. *Anas boschas*. MALLARD.—Very common in Hoodoo Valley during August, when females with large flocks of young were frequently seen. No males were taken. Also seen at Lake Kaniksu.

3. *Aythya americana*. REDHEAD.—Lake Kaniksu and Hoodoo Valley. Young were seen at the latter place, Aug. 18.

4. *Branta canadensis*. CANADA GOOSE.—One flock, from which three specimens were taken, was seen near Kaniksu Lake, July 26.

5. *Porzana carolina*. SORA.—Common at Hoodoo Lake and the adjacent marshes where the downy young were taken Aug. 13.

6. *Fulica americana*. AMERICAN COOT.—Very abundant at Hoodoo Lake, where on Aug. 13, young measuring from 243 to 282 mm. long were taken.

7. *Gallinago delicata*. WILSON'S SNIPE.—Two specimens were collected near Pullman, Jan. 21, when the ground was covered with snow. Specimens were also taken at Blue Lake.

8. *Ægialitis vocifera*. KILLDEER.—Common at Pullman. Observed in the spring as early as March 1.

9. *Dendragapus obscurus richardsonii*. RICHARDSON'S GROUSE.—Commonly known as 'Blue Grouse.' They were abundant in the vicinity of Blue Lake from the 12th until the 30th of July. During this time the females and young were migrating from higher altitudes. They were abundant on the foothills east of Hoodoo Valley during the latter part of August. None were seen in the lower parts of the valley. No males were observed.

The small young have a pointed tail of three or four feathers with white shaftlines. Later, when the more permanent feathers grow out, the tail consists of a dark colored, square cut basal part, beyond which the lighter feathers project. When the dark feathers have grown to be as long as the lighter ones the latter are shed.

When disturbed, the mother and young usually took to the nearest trees and quietly observed the intruder. Both old and young were very tame, and while foraging they frequently came into camp. Once, on looking up from my work, I saw a female quietly walking out of my tent, while her five young were searching for food near by.

10. *Canachites franklinii*. FRANKLIN'S GROUSE.—Although not a common bird, the 'Fool-hen' was sometimes seen in the forests of black pine near the Pend d'Oreille River. One sat sedately on a limb while a revolver was emptied at her. The shots having missed, roots and stones were thrown, which she avoided by stiff bows or occasional steps to the side.

11. *Bonasa umbellus togata*. CANADIAN RUFFED GROUSE.—Females and downy young were observed at Diamond Lake, June 13 and 23.

During the early part of July, young were frequently seen in the vicinity of Mt. Carleton. No males were observed.

In August, individuals of this species were commonly seen in the valley of Hoodoo Lake.

12. *Zenaidura macroura*. MOURNING DOVE.—Vicinity of Pullman, during September.

13. *Buteo borealis calurus*. WESTERN REDTAIL.—One was secured at Blue Lake, and another, a young individual, near the Pend d'Oreille River.

14. *Aquila chrysaëtos*. GOLDEN EAGLE. — Kaniksu and Blue Lakes. Not common.
15. *Falco columbarius*. PIGEON HAWK. — Pullman, Washington, October; Hoodoo Valley, August.
16. *Falco sparverius*. AMERICAN SPARROW HAWK. — Sparrow Hawks were common in Hoodoo Valley during the latter part of August.
17. *Pandion haliaëtus carolinensis*. AMERICAN OSPREY. — Pullman, Wash., May 1. Fish Hawks were frequently seen at all the lakes visited. Sometimes they caught fish so large that they could scarcely manage them.
18. *Asio wilsonianus*. LONG-EARED OWL. — One female taken in Hoodoo Valley, Aug. 18.
19. *Asio accipitrinus*. SHORT-EARED OWL. — Found breeding at Pullman, Wash., May 5, and later. The nests, on the ground, are often plowed under by ranchers.
20. *Speotyto cunicularia hypogæa*. BURROWING OWL. — Occasionally seen in the vicinity of Pullman. Nests in burrows of *Spermophilus*.
21. *Ceryle alcyon*. BELTED KINGFISHER. — Diamond Lake and Blue Lake. Not common.
22. *Dryobates villosus harrisii*. HARRIS'S WOODPECKER. — One young individual taken in Hoodoo Valley.
23. *Sphyrapicus varius nuchalis*. RED-NAPED SAPSUCKER. — Common in the vicinity of Diamond Lake.
24. *Colaptes cafer*. RED-SHAFTED FLICKER. — Pullman. From March to September. Not common.
25. *Chordeiles virginianus*. NIGHTHAWK. — Abundant at Diamond Lake and at all points visited in Idaho. Downy young were found at Blue Lake, July 20.
26. *Trochilus alexandri*. BLACK-CHINNED HUMMINGBIRD. — One female taken at Blue Lake, July 10. Not common.
27. *Selasphorus rufus*. RUFUS HUMMINGBIRD. — One male and a nest containing two young were observed at Blue Lake, July 17.
28. *Otocoris alpestris arenicola* (sub. sp.?). DESERT HORNED LARK. — Common at Pullman. They were observed in flocks with *Anthus*, Oct. 21. Abundant in March and April. Nestlings seen Apr. 25.
29. *Pica pica hudsonica*. AMERICAN MAGPIE. — Hoodoo Lake, Aug. 16. Common in winter.
30. *Cyanocitta stelleri annectens*. BLACK-HEADED JAY. — At high altitudes near Blue Lake. Not common.
31. *Sturnella neglecta*. WESTERN MEADOWLARK. — Common at Pullman. Abundant during September, March and April. Not seen in winter.
32. *Poœcetes gramineus confinis*. WESTERN VESPER SPARROW. — Pullman. Numerous small flocks seen in September and April.
33. *Zonotrichia leucophrys intermedia*. INTERMEDIATE SPARROW. — Pullman; common in April.

34. *Spizella monticola ochracea*. WESTERN TREE SPARROW.—Pullman; common during April. They frequent the thickets bordering the creeks, where the first ones were taken, March 3. The ground was covered with snow at that time.

35. *Junco hyemalis connectens* Coues.—A Junco which I identify as above, possibly incorrectly, was common everywhere. Pullman, Mar. 31. Nesting in the vicinity of Mt. Carleton, July 4. Young were seen at Blue Lake, July 18.

36. *Melospiza melodia montana*. MOUNTAIN SONG SPARROW.—Common in flocks with *Spizella monticola ochracea* in the vicinity of Pullman during the first week of March. Common on the low meadows bordering Blue Lake.

37. *Passerella iliaca schistacea*. SLATE-COLORED SPARROW.—Pullman. Usually seen perched on the topmost twig of some bush, singing vigorously.

38. *Piranga ludoviciana*. LOUISIANA TANAGER.—Frequently seen at Blue Lake.

39. *Ampelis cedrorum*. CEDAR WAXWING.—Small flocks of these birds were occasionally seen at Blue Lake.

40. *Geothlypis tolmiei*. MACGILLIVRAY'S WARBLER.—Near Mt. Carleton in open woods. A nest with eggs was seen, June 30.

41. *Anthus pensilvanicus*. AMERICAN PIPIT.—Abundant at Pullman during the latter part of October in flocks with *Otocoris*.

42. *Sitta canadensis*. RED-BREASTED NUTHATCH.—Blanchard Valley, on the east slope of Mt. Carleton.

43. *Regulus calendula*. RUBY-CROWNED KINGLET.—Pullman; common during April.

44. *Hylocichla ustulatus swainsonii*. OLIVE-BACKED THRUSH.—Common at Blue Lake during the latter part of July. Also observed in Hoodoo Valley.

45. *Merula migratoria propinqua*. WESTERN ROBIN.—Robins were seen in every locality visited. They were common in flocks at Pullman during September. In the Spring (March 3) they returned before the snow melted, and began nesting so early that the eggs and young birds were frequently frozen.

DESCRIPTION OF A NEW SHEARWATER FROM THE
HAWAIIAN ISLANDS.

BY H. W. HENSHAW.

Puffinus newelli, sp. nov.

Above, including upper surface of wings and tail, clear and somewhat glossy black. Border of under wing-coverts black. Beneath, including under tail-coverts, pure white. Maxilla and edge and tip of mandible black; rest of maxilla light brown. Tarsus and feet light yellow, but black along the outer posterior side of tarsus, the outer toe and half the middle toe. Wing, 8.65; tail, 3.75; bill, 1.28; tarsus, 1.80.

The above is a description of a Shearwater obtained by Mr. M. Newell of Hilo (Brother Matthias of the Catholic Brotherhood) in Waihee Valley, Island of Ulani, in the spring of 1894, and by him recently presented to the author. The sex was not determined. The bird was taken from its burrow with several others by natives and brought to Mr. Newell alive. The latter saved two specimens. One, the type, is in my possession; the other is probably still extant and in Honolulu.

In 1894 the species was numerous enough in the above mentioned locality, but its present status is doubtful, for the mongoose, which is rapidly exterminating the native Puffins elsewhere upon the islands, is an inhabitant also of Ulani.

As this Puffin was quite unknown to me, and as no account of it appears in either Rothschild's or Wilson's works upon the island birds, I sent the specimen to Mr. Ridgway who kindly compared it with National Museum material. Mr. Ridgway's remarks upon the specimen are as follows: "The *Puffinus* which you sent for identification is without doubt a new species. It comes nearest to *P. auricularis* Townsend, of Clarion Island (Revillagigedo group, N. W. Mexico), but differs in blacker color of upper parts, wholly white malar region, more extensive, more uniform and more abruptly white anterior and central under tail-coverts, more extensive and 'solid' blackish border to under wing-covert region, and especially in the very abrupt line of demarkation along sides of neck between the black of upper parts and white of under

parts. *P. auricularis* also has the bill entirely black and also stouter."

The species is dedicated to Mr. Newell, who has paid considerable attention to Hawaiian birds and has made extensive collections.

NESTING HABITS OF THE PACIFIC COAST SPECIES OF THE GENUS *RUFFINUS*.

BY A. W. ANTHONY.

Plate VIII.

THE BLACK-VENTED SHEARWATER (*Puffinus opisthomelas*), the most abundant of our Pacific Shearwaters, is extremely plentiful off the coast of central California during the summer months, and is found at all seasons of the year south of the Santa Barbara Islands. How far north its range extends I am unable to say, but I have seen what I was reasonably sure was this species off the Columbia River in November. Since its summer range is so far to the north it is a little strange that no breeding grounds have been discovered north of the Mexican Boundary.

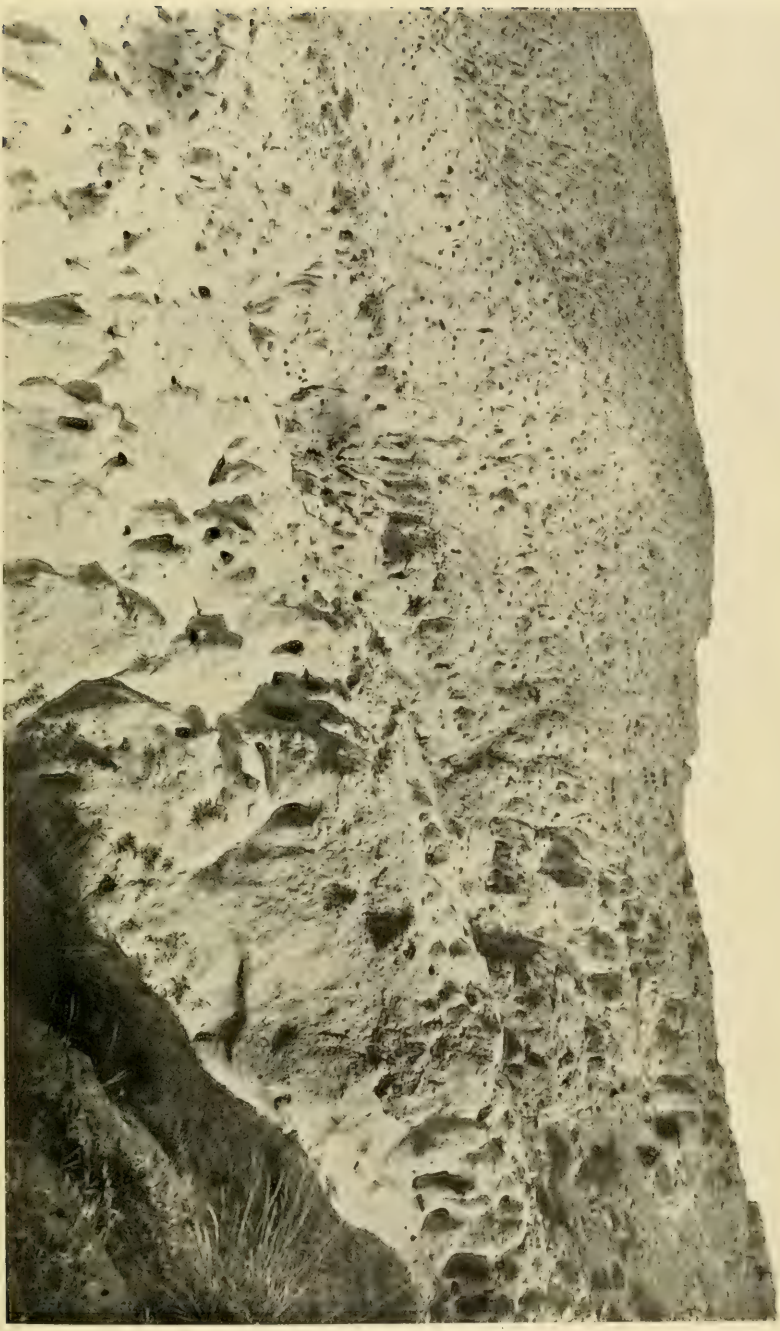
Several years since Major Bendire wrote me that there was in the National Museum two or three eggs said to have been taken on one of the Santa Barbara Islands. As I now remember, he expressed some doubt as to the location, but considered the identification correct. That it does not nest on any of the larger of the Santa Barbara group, I am certain, since the foxes that inhabit the islands would exterminate them, but it is possible that on some of the smaller islands where there are no enemies a few may be found nesting. South of the Santa Barbara Islands I am confident none are found until Guadaloupe is reached, about two hundred miles south of the National boundary.

Several years since, I found the Black-vented Shearwater (*Puffinus gavia*) rather common on Guadaloupe, where their burrows were dug under huge blocks of lava in several parts of the island, but in no place was there any large colony. Their nests

were all inaccessible owing to the nature of the sites selected, either in natural holes in the lava or under large boulders, and no eggs were secured. A night was spent on the top of the island in a heavy cypress growth, about 4000 feet above the sea. Here the Shearwaters were heard all night, their choking, gasping notes coming from all sides as they flew through this grove.

On the San Benito Islands, lying between Guadaloupe and Cerros Islands, I have also found a few *P. opisthomelas* nesting. So far as I have been able to discover, there are no burrows on these islands, all the nests being in small caves, which are nearly filled with deposits of guano left by untold generations of *Puffinus*. The caves are all small and the nests inaccessible but I think that each cave was inhabited by several pairs of birds, judging by the outcry and warning hisses that greeted my approach to the entrance.

About thirty-five miles south of San Benito Islands lies Natividad Island, a lower and more sandy island than those previously mentioned — a condition which seems to suit the requirements of the Black-vented Shearwaters to a nicety, for here are found thousands of them, nesting the full length of the island, some three miles in extent. With the exception of a few rocky slopes and ridges the entire island may be said to be one almost continuous colony. This island I first visited in August, 1896. The size of the burrows at once attracted my attention, and a closer examination revealed the unmistakable tracks of a *Puffinus*. Though the footprints were abundant and fresh, proving that the burrows were still visited at night, all of those examined were unoccupied. I again called at Natividad April 10, 1897, and found the breeding season at its height, each burrow containing either a pair of Shearwaters or one Shearwater and a fresh egg. In no case, I think, did I find an egg in a burrow with two birds. The burrows were usually about ten feet in length, seldom if ever straight, but with one or two sudden turns to the right or left, the nest sometimes being but two feet from the entrance though at the end of a ten foot burrow. Few of the nests were over eighteen inches below the surface, the burrows being for the most part nearly horizontal, and the loose nature of the soil made walking



NESTING COLONY OF WEDGE-TAILED PETRELS (*Puffinus cuneatus*), ON SAN BENEDICTO ISLAND, LOWER CALIFORNIA.

anything but a pleasure, as one constantly broke through into tunnels, the exact location of which it was impossible to determine.

The tracks in the fresh soil about the entrance to the burrows showed the imprint of the tarsus for its full length, showing that the birds rest their weight on the tarsus as much as on the toes.

There was little attempt at nest-building, the eggs for the most part being laid in a depression in the sand at the end of the burrow. In a few cases a number of small twigs and sticks had been placed in the hollow forming a very crude nest. Before the egg is deposited the burrow is occupied by both birds, and I have found them on the nest at least a month before any eggs were laid. Just how early they take to the burrows I am unable to say, not having visited the nesting colony earlier than the first week in March, when all the burrows were occupied.

I have never heard any love notes from this species when in the burrows. Their outcry at night, however, when they emerge from their nests and fly about over the island, is something unique in my experience. The note is a series of choking cries coupled with a hissing, like escaping steam, the same that I have at times heard them utter when disturbed in their burrows. On July 1, I found the burrows on Natividad occupied entirely by young birds that were nearly or quite as large as the adults, but still clothed in down through which were growing a few feathers. They were sooty black above and lighter below. When brought to the light they gave vent to their feelings in the characteristic notes of the adults.

About Cape St. Lucas Townsend's Shearwater (*Puffinus auricularis*) is rather common, and though perfectly distinct specifically it is quite closely related to *P. opisthomelas* and has a similar breeding season. On San Benedicto Island I found a few nesting the last week in May. At this date most of the young were but a few days old, covered with sooty down above, and paler-grayish below. With the smaller young I often found one of the parents, but they were as frequently alone. The burrows were all confined to the higher parts of the island — about 500 feet above the sea, where they were dug among the bunches of thick, tangled grass, and were well scattered, a dozen or so being a large colony. The burrows were not so deep or long as were those of *P. opis-*

thomelas on Natividad, averaging about five feet in length. On Clarion Island this species was again found in a similar location, all of the burrows being confined to a thick growth of grass, on the high parts of the island.

The Clarion colonies were more extensive, each suitable patch of grass being well populated. Few birds were seen at sea during the daytime and at night, those that visited the nests must have been much more silent than is the Black-vented Shearwater, in the vicinity of its colonies, for I do not remember hearing any notes that I could attribute to *P. auricularis* though one or two of those that were dragged from their nests gave vent to their displeasure in notes similar to those of *P. opisthomelas*.

About Cape St. Lucas, and between that point and the Revillagigedo Islands, the Wedge-tailed Shearwater (*Puffinus cuneatus*) is found in abundance in May and June. It probably may occur at other seasons, but as I have not visited the region of the Cape during other seasons I can give no assurance of its doing so. This species is of exceptional interest, as it belongs to a group of Shearwaters new to the North American fauna, and of which little is known. I was so fortunate as to discover a large colony nesting on San Benedicto Island, from which was obtained a fine series of skins with all of the intergrades between the white-bellied phase of '*cuneatus*' and the dusky form described by L. Stejneger from the Sandwich Islands as *knudseni*.

On first landing on San Benedicto, the first of May, I heard a low murmuring noise which seemed to come from the opposite side of the island. Thinking it might come from a rookery of seals, I started out to investigate, but soon found that I was getting no nearer the source of the noise, which possessed a ventriloquial power difficult to locate. I soon, however, found myself surrounded by large burrows which fairly honeycombed the entire south end of the island, which was so completely undermined that one constantly broke through into burrows, frequently sinking to the hips in ground that had every appearance of being solid.

The accompanying photograph (Plate VIII) gives one but a faint conception of the number of burrows, and of course shows but a very small part of the colony.

From many of the holes came moans and sobs in soft low

tones, inexpressively sad and wierd, — the love notes of *Puffinus cuneatus*.

A number of the burrows were opened, and from each were taken two birds, which fought and bit most savagely on being dragged to the light. By far the greater number were in dark plumage, but many showed lighter underparts, and in some cases a perfectly typical '*cuneatus*,' with pure white underparts, was found in the same burrow with a dark '*knudseni*.'

At this date the burrows were about four to five feet in length, most of them running in a nearly horizontal direction along the sides of the steep narrow ravines that everywhere cut this end of the island.

The soil is chiefly of fine pumice, in some places soft and easily excavated, but in others so hard as to require the use of a pick in opening the burrows. In most of the excavations was a rude attempt at nest building, consisting of a few sprigs of green grass and other vegetation which grew about the colony, and on this meagre platform were both birds, but no eggs. Nor did the condition of the birds indicate that the actual nesting season was at hand. About sunset the birds from the island began to seek the water, meeting a similar tide moving in from the sea. They mostly centered about the south end of the island, which soon presented the appearance of a vast beehive. Thousands upon thousands of Shearwaters were circling about with easy flight, much more airy and graceful than that of any Shearwater with which I am familiar; especially was the difference accentuated when an occasional *auricularis* with typical Shearwater flight, skimmed through the throng. The greater part of those birds which came from the higher parts of the island descended at an angle of about 45°, with wings set until near the water, when they sailed off over the waves until lost to view, while others descending in a spiral course joined their fellows in circling about the water at the foot of the cliffs. There was little, if any, outcry, though the sobbing notes were often heard from the birds on shore. One bird — doubtless an albino — had a pure white head and dusky body, strongly suggestive of a Heermann's Gull. It circled several times about our skiff, which was an object of great interest to the busy throng.

Thinking I would find eggs, I returned to San Benedicto from Socorro Island two weeks later, but was disappointed. Many of the burrows were empty, and all had been extended two feet or more in length, and the nest of green plants moved back to the end. As before, when birds were found there were usually two.

The two following weeks were spent at Clarion, between two and three hundred miles west of San Benedicto. At Clarion, *P. cuneatus* was rare, and only seen at sea. Neither here nor at Socorro were there any signs of nesting colonies. San Benedicto was reached again May 31, and though dozens of burrows were opened, scarcely any birds were found. The tunnels had now a length of from eight to ten feet, having been extended another two feet or more, and as before the nesting material moved to the end. The few birds found were generally in the shorter burrows, which were perhaps incomplete. Only one egg was found with the parent, a white-bellied bird.

Toward evening a greater percentage of birds began to appear from seaward, but at no time before dark did the numbers congregated about the island equal those seen a month earlier.

From the data obtained I would place the nesting season of *P. cuneatus* at least three months later than that of either *opisthomelas* or *auricularis*, which both deposit their eggs at about the same time, in early March.

DESCRIPTIONS OF THIRTY NEW NORTH AMERICAN
BIRDS, IN THE BIOLOGICAL SURVEY
COLLECTION.

BY E. W. NELSON.

RECENT study of the rich collection of Mexican birds accumulated by the Biological Survey has thrown much light on the southward extension of the life zones found within the United States. Many genera are represented in the various faunal areas by distinct species, while in other cases wide ranging species are broken up into geographic races. The series of specimens from almost every part of Mexico now in the collection show the existence of various hitherto unsuspected subordinate faunal areas, and has proved rich in types of new species and subspecies. The present paper gives some of the results of recent preliminary work on the collection.

I am greatly indebted to Mr. Robert Ridgway, Curator, and Dr. Chas. W. Richmond, Assistant Curator of Birds, in the U. S. National Museum, for cordial assistance during the preparation of this paper. All measurements are given in millimeters.

Crypturus inornatus, sp. nov. BROWN-BACKED TINAMOU.

Type, No. 158434, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Metlatoyuca, Puebla, Mexico, February 14, 1898, E. A. Goldman.

Distribution.—Dense, humid tropical forests of northern Vera Cruz and adjacent part of Puebla.

Specific characters.—Nearest *C. mexicanus*, from which the males may be distinguished by their deep reddish brown, slightly barred backs and more rufous underparts; the females are much deeper, more reddish brown both above and below.

Description of adult male (type).—Crown and forehead black slightly suffused with grayish; nape dark reddish brown becoming light vandyke brown with a faint purplish bloom on back and sides of neck and fore part of shoulders; shoulders and upper back plain, dark burnt umber; rump and upper tail-coverts lighter, more rusty brown and sparsely and indistinctly barred with black; primaries and secondaries dark slaty edged with brownish; wing-coverts, scapulars and tertials slightly paler brown than back and finely and indistinctly maculated but not barred with blackish; sides

of head to upper part of neck cinnamon brown; chin and throat white; under side of neck along median line dingy grayish brown shading into surrounding color; breast deep, dark cinnamon brown becoming darker and browner on sides, and clearer, paler cinnamon along median line; abdomen, flanks and under tail-coverts mixed buffy, whitish and dull cinnamon obscurely and coarsely barred with blackish.

Dimensions of type.—Wing, 166; tail, 56; culmen, 29; tarsus, 52.

Description of adult female from type locality.—Crown rusty, grayish brown (becoming bright rusty brown on nape) and obscurely barred with black; back and sides of neck bright rusty cinnamon; middle of fore part of shoulders tawny, sepia brown becoming dark cinnamon brown on sides; interscapular region dark umber brown shading into cinnamon on upper tail-coverts with entire back coarsely and obscurely barred with black; upper surface of wings slaty blackish coarsely barred with tawny cinnamon; sides of head tawny cinnamon with a vinaceous shade on adjacent part of neck; chin and throat white; under side of neck dark ashy washed with rusty brown; breast bright rusty cinnamon, darkest on sides and palest next abdomen; abdomen and flanks dull buffy, obscurely and coarsely barred with blackish; under tail-coverts deep buff coarsely maculated with black.

Dimensions of female.—Wing, 165; tail, 54; culmen, 29; tarsus, 52.

General notes.—The darker color and absence of black bars on wings and fore back of the males separate this bird at once from its nearest ally, *C. mexicanus*. The females are less distinct; the darker back and brighter colored nape and neck of *C. inornatus* suffice, however, to distinguish it at a glance.

Both *Crypturus mexicanus* and *C. occidentalis* inhabit the low, scrubby thickets of arid tropical districts and may be distinguished from their Mexican congeners of the more humid districts by their much paler colors. The general resemblance of *C. mexicanus* of Tamaulipas in eastern Mexico to *C. occidentalis* of Tepic, on the opposite side of the Continent, but living in very similar climatic conditions, is much greater than that of *C. mexicanus* to *C. inornatus* living in contiguous districts but with marked climatic differences.

***Dendrortyx macrourus dilutus*, subsp. nov. MICHOCAN
WOOD GROUSE.**

Type, No. 155562, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Patzcuaro, Michoacan, Mexico, August 2, 1892, E. W. Nelson.

Distribution.—Mixed oak and pine forest on the Sierra Madre of Michoacan.

Subspecific characters.—About equal in size to *D. macrourus* with broad central stripes of rusty chestnut on feathers of underparts nearly as far back along sides as in *D. m. striatus*. In general color, most like typical *D. macrourus* but rusty chestnut about neck and under parts paler; back, upper surface of wings, tail and sides of body with a decidedly less gray and more brownish suffusion; bill very heavy and tumid and only equalled by that of *D. oaxacæ*.

Dimensions of type.—Wing, 167; tail, 155; culmen, 19; tarsus, 56.

General notes.—It is with some hesitation that I name still another form of *Dendrortyx macrourus*, yet the bird described above differs so much from any of the known forms that I see no other course to pursue. This appears to be one of those species which are in such a plastic condition that comparatively slight changes in climatic conditions, accompanied by partial geographic isolation, produce appreciable differences. In such cases it appears preferable, when the differences are sufficiently marked, to recognize these local forms, rather than to ignore them and include an entire group of geographic races under a single name, as would be the only other logical method.

Cyrtonyx montezumæ mearnsi, subsp. nov. MEARNS'S
QUAIL.

Type, No. 142385, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Ft. Huachuca, Arizona, April 30, 1892, Dr. A. K. Fisher.

Distribution.—Southwestern Texas and the southern half of New Mexico and Arizona, ranging thence into northern Mexico.

Subspecific characters.—In both sexes generally paler than true *C. montezumæ*; the males much grayer or more ashy on upper side of wings and paler brown on back; posterior part of crest decidedly lighter brown; sides of breast and body paler slaty gray and more thickly white-spotted. The females have paler backs with broader and more conspicuous pale shaft streaks, especially on rump.

Dimensions of type.—Wing, 117; tail, 58; culmen, 14; tarsus, 30.

General notes.—The Montezuma or Massena Quail of the Southwestern United States occupies a more arid region than that inhabited by the typical birds of the mountains bordering the Mexican

tablelands farther south and, as might be expected, indicates this difference in environment by its paler colors. The birds of southern Arizona are typical of this pale form. It is named for Dr. Edgar A. Mearns, U. S. A., in recognition of the great amount of zoölogical work he has done in the region which it inhabits.

***Amazona oratrix tresmariæ*, subsp. nov. TRES MARIAS
PARROT.**

Type, No. 156735, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Maria Madre Island, Tres Marias group, Western Mexico, May 4, 1897, E. W. Nelson and E. A. Goldman.

Distribution.—Tres Marias Islands, western Mexico.

Subspecific characters.—Distinguished from true *A. oratrix* by rather light, grass green back, more bluish green underparts and much greater extension of yellow on neck, especially on under side.

Dimensions of type.—Wing, 230; tail, 125; culmen, 34; tarsus, 26.

General notes.—The type of Mr. Ridgway's *A. oratrix* came from Petapa, Oaxaca, not far from Tehuantepec City. From this point they range through Western Mexico at least to the State of Colima, and crossing the Isthmus of Tehuantepec reach Central Tamaulipas in Eastern Mexico. Birds from all parts of this wide range are nearly uniform in color and agree in having the yellow on the sides of the head and under side of the neck rarely extending farther back than the ear-coverts and middle of the throat. In the Tres Marias form, the yellow on the adult birds commonly covers the entire head and neck and often encroaches on the shoulders and breast. The back of true *A. oratrix* is oil green. Very old birds of both forms often have the yellow feathers on the hind neck, and sometimes on the lower neck, edged or banded with dark red. This is much more pronounced in specimens from the Tres Marias than in those from the mainland.

***Momotus lessoni goldmani*, subsp. nov. GOLDMAN'S MOTMOT.**

Type, No. 155138, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Motzorongo, Vera Cruz, Mexico, March 5, 1894, E. W. Nelson and E. A. Goldman.

Distribution.—Humid tropical forests of Vera Cruz, adjacent part of Oaxaca, and south along the Gulf Coast probably to Yucatan.

Subspecific characters.—Body much greener than *M. lessoni* with only a light suffusion of brown on breast; blue border of crown paler, with only a trace of or entirely lacking the rich smalt blue along posterior border.

Description of type.—Lores, cheeks and line over eyes and isolated oval area on middle of crown black; black crown patch broadly bordered by pale greenish blue nearly uniform and never showing more than a trace of rich smalt blue border posteriorly, so conspicuous in true *M. lessoni*; dorsal surface, including sides of head, back of eyes, neck and back light olive green anteriorly and shading into grass green on lower back, rump and upper tail-coverts; tail grass green at base, shading gradually into blue near end and tipped with black; primaries edged with dark greenish blue, this color shading through dark bluish green on secondaries to nearly dark green on tertials; chin and throat light grass green shading imperceptibly into olive green of neck, breast and sides of body, and thence into clearer green on abdomen and flanks.

Dimensions of type.—Wing, 142; tail, 246; culmen, 49; tarsus, 32.

General notes.—This subspecies may be easily distinguished by the absence of nearly all of the dark rufous suffusion which gives a strong reddish shade to the underparts of *M. lessoni*, and by the lighter, greener back and uniform greenish blue border of the crown. Specimens from Huehuetan on the Pacific coast of Chiapas, are nearly typical *M. lessoni*, as are those from Costa Rica. *M. lessoni goldmani* appears to be found only on the Gulf Coast of Mexico. The type of *M. lessoni* came from Realejo, Nicaragua.

Melanerpes frontalis, sp. nov. CHIAPAS WOODPECKER.

Type, No. 154938, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. San Vicente, Chiapas, Mexico, December 12, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Known only from type locality.

General characters.—Scarlet crown patch usually small and separated from orange yellow nape by a dark smoky gray area; back broadly barred black and white; rump and middle tail-feathers strongly barred black and white. Pattern of markings on head and back most like that of *M. hoffmanni*.

Description of type.—Nasal tufts pale yellowish; forehead dull white with backward extension of same along sides of crown to middle of orbits,

enclosing on sides the small crown patch of scarlet; latter separated from rich orange nape by broad band of dark smoky gray nearly uniform with rest of head, neck and breast; middle of back and rump broadly barred with black and white as in *M. hoffmanni* (the white bars much broader than in *M. santacruzi*); upper tail-coverts white, with broken V-shaped black markings; middle tail-feathers white broadly barred on basal third and along inner webs, except at tips, with black; border of outer webs on distal third and entire tips black, upper surface of wings broadly barred with white; middle of primaries with irregular but well marked white area; abdomen barred with dull black and white and thinly washed with orange yellow; under tail-coverts white heavily barred with black; two outer tail feathers black with well marked white bars.

Dimensions of type.—Wing, 135; tail, 81; culmen, 30; tarsus, 21.

General notes.—*M. frontalis* resembles *M. hoffmanni* of Costa Rica, but is considerably larger, with a smaller red patch on the crown, and the lower parts are much paler gray with a paler wash of yellow on the abdomen. The crissum is strongly barred black and white in place of the V-shaped marks of *M. hoffmanni* and the two outer tail feathers are distinctly barred with white.

Melanerpes santacruzi fumosus, subsp. nov. SMOKY-BREASTED WOODPECKER.

Type, No. 154964, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Huehuetan, Chiapas, Mexico, March 2, 1896, E. W. Nelson and E. A. Goldman.

Distribution.—Pacific Coast district of southern Chiapas and adjacent part of Guatemala.

General characters.—Generally similar to *M. santacruzi* but smaller with heavier bill, darker back; under parts grayer, less brownish; lower rump and upper tail-coverts barred or marked with black.

Description of type.—Nasal tufts faintly washed with yellow; forehead dull whitish; crown and nape with a broad continuous band of scarlet tinged posteriorly with golden; back and top of wings broadly barred with black and narrowly barred with white; rump white irregularly marked with black; upper tail-coverts with black shaft lines; middle tail feathers black, lateral ones inconspicuously marked with white; sides and under parts of head, neck and body to abdomen dark, dingy, smoky gray with a slight brownish tinge; abdomen obsoletely barred with black and dull whitish and washed with orange; under tail-coverts strongly barred black and white.

Dimensions of type.—Wing, 137; tail, 76; culmen, 31; tarsus, 22.

General notes. — This form differs from *M. polygrammus* by its much darker back and underparts; its barred and black-marked rump and upper tail-coverts and generally unmarked rectrices and more heavily barred under tail-coverts.

Melanerpes dubius veræcrucis, subsp. nov. VERA CRUZ
WOODPECKER.

Type, No. 154835, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Coatzacoalcos, Vera Cruz, Mexico, April 15, 1896, E. W. Nelson and E. A. Goldman.

Distribution. — Southern half of Vera Cruz, Tabasco, and bordering part of Chiapas.

Subspecific characters. — Smaller than *M. dubius* with broader white frontal area and rather broader white barring on dorsal surface; sides and lower part of head, neck, and body darker, more brownish gray; crissum more heavily barred with black.

Dimensions of type. — Wing, 124; tail, 76; culmen, 29; tarsus, 23.

General Notes. — This form inhabits a region of much greater humidity than that of typical *M. dubius* and a specimen from the heavily forested region of Chiapas is darker than Vera Cruz birds and probably represents the extreme of the form in this respect.

Dryobates villosus intermedius, subsp. nov. TABLELAND
WOODPECKER.

Type, No. 154901, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Villar, San Luis Potosi, Mexico, September 22, 1892, E. W. Nelson.

Distribution. — Arid mountains of the southern and eastern part of the Mexican tableland, north of the valley of Mexico.

Subspecific characters. — Intermediate in size between *D. v. hyloscopus* and *D. v. jardinii*. The upper surface of wings scantily white-spotted much as in *D. jardinii*; lores mainly black; throat, lower side of neck and breast smoky gray, much paler than in *D. jardinii*, abdomen more whitish and under tail-coverts white; stripe down back washed with smoky but much paler than color of breast.

Dimensions of type. — Wing, 121; tail, 76; culmen, 28; tarsus, 23.

Nyctibius jamaicensis mexicanus, subsp. nov. MEXICAN
GOATSUCKER.

Type, No. 158535, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Metlatoyuca, Puebla, Mexico, January 26, 1898, E. A. Goldman.

Distribution.—Eastern coast region of Mexico north to northeastern Puebla.¹

Subspecific characters.—Similar to *N. jamaicensis* but decidedly larger and browner, this last character being specially marked on lesser wing-coverts; pale spots along outer border of primaries much duller gray in less vivid contrast to dark part of feathers.

Measurements of type.—Wing, 310; tail, 220; culmen, 29; tarsus, 16.

General notes.—An adult ♀ from the same locality as the type measures, wing, 304; tail, 224; culmen, 26; tarsus, 14. An adult bird, sex unknown, but probably a male, from Mirador, Vera Cruz, measures: wing, 310; tail, 220; culmen, 24; tarsus, 15. A specimen from the island of Jamaica and representing typical *N. jamaicensis* measures: wing, 275; tail, 186; culmen, 23; tarsus, 13.

Antrostomus oaxacæ, sp. nov. OAXACA WHIPPOORWILL.

Type, No. 154735, ♀ ad., U. S. Nat. Mus., Biological Survey Collection. Near City of Oaxaca, Oaxaca, Mexico, August 14, 1894, E. W. Nelson and E. A. Goldman.

Distribution.—Sierra Madre bordering southern part of Mexican tableland from Michoacan through Oaxaca to adjacent part of Chiapas.

Specific characters.—Most closely related to *A. macromystax* but back darker; black spots on scapulars larger; feathers of nape rather coarsely barred with black and reddish brown; middle of back and rump heavily streaked with black and spotted and mottled with reddish and grayish brown; below entire breast and sides of body blackish coarsely marked with irregular spots of grayish and reddish brown; the fine maculation of back and breast characteristic of *A. macromystax* almost wholly replaced in this species by coarser spotting, rendering the two easily separable.

Dimensions of type.—Wing, 162; tail, 119; culmen, 14; tarsus, 18.

¹ This species has been recorded from Mazatlan, Sinaloa, and thence southward on the Pacific Coast of Mexico, and the birds found there probably belong to the present subspecies, but I have seen no specimens from that region, so cannot be certain.

General notes.—It is possible that the present bird may be found to be a subspecies of *A. macromystax* but this appears rather unlikely considering the typical character of specimens of the latter taken on the border of the range of *A. oaxacæ*.

***Antrostomus chiapensis*, sp. nov. CHIAPAS WHIPPOORWILL.**

Type, No. 154737, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Valley of Comitán, Chiapas, Mexico, December 11, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Known only from type locality near border of Guatemala.

Specific characters.—Darker even than *A. salvini*; back and upper surface of wings spotted and barred with rufous brown; under parts blackish coarsely marked with dull buffy; under tail-coverts not barred.

Description of type.—Crown with broad median streak of black with a few oval rufous brown spots along borders; sides of crown rather coarsely mottled with black, gray and brown; foreback black obscurely barred with dull rufous brown; rest of back, rump and upper tail-coverts black with transverse spots of rufous brown on edges of feathers, most heavily marked on coverts; scapulars black with large spots of rusty buff along borders; upper surface of wings and outer edges of primaries distinctly spotted with a deeper shade of same; upper surface of tail black rather finely mottled with rusty and dark grayish forming indistinct V-shaped bands; sides of head blackish mixed with dark golden buffy; chin and throat black irregularly barred with dingy rusty and rusty whitish, succeeded by a narrow white collar; rest of underside of body black, coarsely but obscurely barred with grayish and rusty brown on forebreast; coarsely spotted with pale dingy, rusty white on rest of breast and sides, and broadly but obscurely barred with dark, dingy buff; under tail-coverts dark buff with hidden shaft bands of black; inside of inner webs of primaries almost uniform black with only slight traces of dark rusty spots; white on outer ends of tail feathers about as in *A. vociferus*.

Dimensions of type.—Wing, 169; tail, 127; culmen, 14; tarsus, 18.

General notes.—The only specimen taken of this well marked species was secured in the border of the mixed oak and pine forest on the highlands of Chiapas near the Guatemalan line.

Cypselus brunneitorques griseifrons, subsp. nov. NORTHERN
RUFIOUS-COLLARED SWIFT.

Type, No. 157055, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Santa Teresa, Territory of Tepic, Mexico, August 8, 1897, E. W. Nelson and E. A. Goldman.

Distribution.—Sierra Madre Mountains of Tepic, Jalisco, Western Zaca-tecas and Southern Durango, Mexico.

Subspecific characters.—Male differs from typical *C. brunneitorques* in more distinctly gray edges to feathers of forehead and over eyes; smaller dark throat patch; paler, more rusty rufous collar; with paler and more grayish shade of black over entire body. The female differs from typical birds in its grayer forehead; darker chin and throat; grayer and less brownish shade to black on entire body; and in having the rump paler than rest of back, forming a poorly marked rump patch.

Dimensions of type.—Wing, 122; tail, 41; culmen, 5; tarsus, 12.

Thalurania ridgwayi, sp. nov. RIDGWAY'S THALURANIA.

Type, No. 155981, U. S. Nat. Mus., Biological Survey Collection. San Sebastian, Jalisco, Mexico, March 18, 1897, E. W. Nelson and E. A. Goldman.

Distribution.—Known only from type locality.

Specific characters.—Readily distinguished from other known members of the genus by the dark, non-metallic underparts.

Description of type.—Top of head from base of bill to middle of crown dark metallic blue; rest of crown dark, rather dull bluish green; sides of head, back of eyes, upper half of neck and entire back bronzy green, darkest on upper tail-coverts; wings dark purplish brown; tail lustrous black with slight purplish gloss; chin, sides of head to lower side of orbits, and entire under side of neck brilliant metallic green; under side of body dull blackish washed with metallic greenish on sides; under coverts lustrous black.

Dimensions.—Wing, 57; tail, 33; culmen, 17.

General notes.—This species extends the range of the genus from Honduras to Central-Western Mexico and is the most unexpected of the results obtained during our brief visit to the 'island' of humid tropical forest found near San Sebastian on the arid tropical west slope of Jalisco. The number of new and interesting birds found during our visit of a few days duration at that locality is sufficient to justify much more thorough work there.

It gives me great pleasure to name this interesting species in honor of Mr. Robert Ridgway.

***Empidonax timidus*, sp. nov. DURANGO FLYCATCHER.**

Type, No. 163905, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. El Salto, Durango, Mexico, July 17, 1898, E. W. Nelson and E. A. Goldman.

Distribution. — Known only from the type locality.

Specific characters. — Much like *E. albigularis* but larger with broader bill and paler colors.

Description of type. — Top of head and back, hair brown, slightly darkest on head and palest on rump; upper tail-coverts broccoli brown; upper surface of wing and tail feathers dull blackish hair brown; secondaries and tertials edged with dull whitish; two distinct wing bands; the anterior one dark buffy, the posterior one buffy whitish; sides of head and neck paler more grayish brown than back with a pale buffy suffusion; sides of breast pale grayish brown; only a faint indication of pectoral band; chin and throat whitish shaded with pale buffy; middle of breast, belly and under tail-coverts dull buffy yellowish, underlaid with pale grayish brown on breast but clear on belly and tail-coverts; under wing-coverts rusty buffy a little paler than in *E. albigularis*; outer web of outer tail feathers a little paler than inner web.

Dimensions of type. — Wing, 62; tail, 57; culmen, 11; width of bill at rictus, 8; tarsus, 17.

***Empidonax bairdi perplexus*, subsp. nov. OAXACA GREEN FLYCATCHER.**

Type, No. 154569, ♀ ad., U. S. Nat. Mus., Biological Survey Collection. Puerto Angel, Oaxaca, Mexico, March 13, 1895, E. W. Nelson and E. A. Goldman.

Distribution. — Arid west coast region of Mexico from near Tehuantepec north to the Territory of Tepic.

Subspecific characters. — Similar to *E. bairdi* but back lighter greenish, wing bands and edgings to secondaries and tertials much paler, more yellowish; larger and paler yellowish area on chin and throat; pectoral band much more restricted, with more of a dull brownish shade; sides of body less heavily washed with olive greenish; rest of lower parts paler yellow.

Dimensions of type. — Wing, 62; tail, 55; culmen, 12; tarsus, 16.5.

General notes.—This form is most readily distinguished from *E. bairdi* by the generally paler color and the much greater extension of the yellow on under parts, the broad area of olive green on the sides of the neck and across the breast being much more restricted and with a more brownish shade.

In 1897 I described *Empidonax bairdi occidentalis* (Auk, XIV, p. 53) and the name was intended to apply to the present form but by an unfortunate slip the specimen chosen and designated as the type, in the light of further material, proves to be strictly referable to *E. bairdi* and it consequently becomes necessary to choose a new type and redescribe the subspecies. The error came about through the fact that both *E. bairdi* and *E. b. occidentalis* occur in winter at Pluma, Oaxaca, the type locality for the last named bird, and are represented in our collection from that point. Nearly typical *E. bairdi* also occurs in winter in western Durango (Chacala) but we took only specimens of *E. b. perplexus* between these two points.

Myiopagis placens jaliscensis, subsp. nov. JALISCO
FLYCATCHER.

Type, No. 156022, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. San Sebastian, Jalisco, Mexico, March 18, 1897, E. W. Nelson and E. A. Goldman.

Distribution.—Western Mexico from Southern Sinaloa south at least through Jalisco and Tepic; straying in winter to Tres Marias Islands.

Subspecific characters.—Larger than typical *M. placens* with proportionately as well as absolutely longer tail; top of head paler and grayer; rest of dorsal surface lighter green; yellow of under parts paler.

Measurements of type.—Wing, 70; tail, 70.5; culmen, 11; tarsus, 19.

General notes.—A specimen in the National Museum from the Tres Marias Islands which I referred to *M. placens* in my report upon the birds of those islands belongs to the present subspecies.

Sittasomus sylvioides jaliscensis, subsp. nov. JALISCO
RUFOUS-TAILED CREEPER.

Type, No. 156012, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. San Sebastian, Jalisco, Mexico, March 17, 1897, E. W. Nelson and E. A. Goldman.

Distribution.—Known only from the type locality.

Subspecific characters.—Distinguished from the typical *S. sylvioides* of eastern Mexico by its larger size and darker grayish brown underparts.

Dimensions of type.—Wing, 84; tail, 89; culmen, 16; tarsus, 18.5.

Dendroornis flavigaster megarhynchus, subsp. nov. LARGE-
BILLED WOODHEWER.

Type, No. 154633, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Puerto Angel, Oaxaca, Mexico, March 9, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Pacific coast of Oaxaca, and perhaps adjacent part of Guerrero, north of the Isthmus of Tehuantepec.

Subspecific characters.—Larger, with a longer and much heavier bill than either *D. flavigaster* or *D. flavigaster mentalis*; nearly intermediate between the two in color.

Dimensions of type.—Wing, 119; tail, 92; culmen, 45; tarsus, 25.

General notes.—*D. flavigaster* is restricted to the wooded mountain slopes of western Mexico from the Territory of Tepic south to Guerrero where it grades into *D. f. megarhynchus*. The range of *D. f. mentalis* is restricted to Sinaloa and the bordering west slope of the Sierra Madre in Tepic and Durango.

Xanthoura luxuosa speciosa, subsp. nov. JALISCO GREEN
JAY.

Type, No. 166055, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. San Sebastian, Jalisco, Mexico, March 13, 1897, E. W. Nelson and E. A. Goldman.

Distribution.—Tropical and subtropical parts of western Jalisco, southern Sinaloa and Tepic.

Description of type.—Nasal tufts and cheek patches intermediate between smalt blue and French blue; crown pale almost campanula blue; spot over and under back part of orbit white, edged with blue; forehead white, shaded with pale yellow; basal part of feathers on entire crown sulphur yellow; black area on sides of head, chin, throat and forebreast, also green on back and tail, about as in typical *X. luxuosa*; sides of neck, a well-marked border to black of breast, and median ventral line thence to vent, chrome yellow; sides of body washed with brighter green than in *X. luxuosa*; under tail-coverts and lateral tail feathers uniform chrome yellow of a richer shade than on breast and median line.

Dimensions of type.—Wing, 125; tail, 150; culmen, 29; tarsus, 41.5.

General notes.—This well-marked subspecies may be at once distinguished from the other races of *X. luxuosa* by the white spots above and below the eyes, the yellow bases of the feathers on the crown and the yellow on the sides of the neck, around the border of the black on the breast, and along the middle of the lower parts. Two specimens in the National Museum from Colima are intermediate between the present form and *X. l. vivida* but are nearest the latter.

***Callothorus æneus assimilis*, subsp. nov. SMALL RED-EYED
COWBIRD.**

Type, No. 144490, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Acapulco, Guerrero, Mexico, January 25, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Pacific coast of Mexico from southern Jalisco and Colima to Chiapas.

Subspecific characters.—Male similar to *C. æneus* but much smaller. Female unknown.

Measurements of type.—Wing, 114; tail, 80; culmen, 21; tarsus, 30.

General notes.—Birds from San Blas, Tepic, are intermediate in size between typical *C. æneus* from Mazatlan and *C. a. assimilis* from Colima and the interior of southern Jalisco.

***Sturnella magna alticola*, subsp. nov. HIGHLAND MEADOW-
LARK.**

Type, No. 144524, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Ocuilapa, Chiapas, Mexico, August 21, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Pacific coast of Mexico from Salina Cruz, Oaxaca, to Tonala, Chiapas, and thence through the high interior of Chiapas and the highlands of Guatemala at least to Dueñas.

Subspecific characters.—Similar to *S. magna* of the eastern United States but intermediate in size between it and the pigmy *S. m. inexpectata*; the bill smaller than in *S. magna* but tarsus relatively and absolutely longer, averaging about 43 mm.; yellow of throat extends up on middle of whitish malar stripe but never occupies all of it as in *S. neglecta*.

Dimensions of type.—Wing, 113; tail, 70; culmen, 32; tarsus, 43.

General notes.—This form may be readily separated from *magna*, *mexicana*, *inexpectata* and *hoopesi* by its proportions and by the yellow on the malar stripe, and from *neglecta* by its darker colors.

Quiscalus macrourus obscurus, subsp. nov. GUERRERO
GRACKLE.

Type, No. 144595, ♀ ad., U. S. Nat. Mus., Biological Survey Collection. Acapulco, Guerrero, Mexico, January 14, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Pacific coast region of Mexico from San Blas, Tepic, to southern Guerrero.

Subspecific characters.—Similar to but smaller than true *Q. macrourus*. Males scarcely distinguishable in color but females very much darker than those of the typical bird.

Description of type.—Above brownish black glossed with dull greenish; head a little browner than middle of back; below very dark almost blackish with greenish; throat and neck only slightly paler than rest of under parts.

Dimensions of type.—Wing, 159; tail, 162; culmen, 32; tarsus, 45.

Amphispiza bilineata pacifica, subsp. nov. SONORA BLACK-
THROATED SPARROW.

Type, No. 164339, ♀ ad., U. S. Nat. Mus., Biological Survey Collection. Alamos, Sonora, Mexico, December 29, 1898, E. A. Goldman.

Distribution.—Pacific coast region of southern Sonora and northern Sinaloa.

Subspecific characters.—In general appearance similar to true *A. bilineata* from Texas but with much smaller white spots on ends of tail feathers, in this character agreeing with *A. b. deserticola* from which it differs in darker color and smaller size.

Dimensions of type.—Wing, 63; tail, 57; culmen, 10; tarsus, 19.

Vireo perquisitor, sp. nov. VERA CRUZ VIREO.

Type, No. 164084, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Papantla, Vera Cruz, Mexico, March 12, 1898, E. A. Goldman.

Distribution.—Heavily forested coast country in northern Vera Cruz.

General characters.—Resembles *V. noveboracensis* but smaller with darker, slenderer bill, and much darker and duller colors above and below, especially on throat and breast.

Description of type.—Bill rather slender, black; lores orange yellow; crown and rest of dorsal surface olive green, slightly darkest on crown and greenest on rump; upper surface of wings and tail grayish black, the feathers mostly edged with green like back; wing-coverts the same with yellowish white tips to greater and lesser coverts, forming two well-marked wing bands; eye with narrow white ring; cheeks, ear-coverts and sides of neck dark olive gray; a paler shade of same extending as a dark wash over pale greenish yellow of chin and throat and over darker greenish yellow of breast and sides of body; a small whitish area on middle of belly; abdomen mainly, and all of under tail-coverts, Naples yellow.

Dimensions of type.—Wing, 57; tail, 45; culmen, 11.5; tarsus, 18.

Vireo amauronotus strenuus, subsp. nov. CHIAPAS VIREO.

Type, No. 143399, ♀ ad., U. S. Nat. Mus., Biological Survey Collection. Tumbala, Chiapas, Mexico, November 5, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Heavily forested mountain slopes up to 5000 feet in northern Chiapas.

Subspecific characters.—Smaller than true *V. amauronotus* with longer, slenderer bill; crown and back darker, more smoky brownish (former almost blackish) with less greenish shading on back and wings; color of under parts same as in *V. amauronotus*.

Dimensions of type.—Wing, 68; tail, 47; culmen, 12.5; tarsus, 18.

Basileuterus belli scitulus, subsp. nov. GUATEMALAN
WARBLER.

Type, No. 143293, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Todos Santos, Guatemala, December 30, 1895, E. W. Nelson and E. A. Goldman.

Distribution.—Highlands of Chiapas and Guatemala.

Subspecific characters.—Larger than *B. belli* from northeastern Mexico, and decidedly darker green on back and darker yellow on under parts with heavier wash of green on sides.

Dimensions of type.—Wing, 65; tail, 61; culmen, 12; tarsus, 23.

General Notes.—An average male of nearly typical *B. belli* from northeastern Mexico (Mt. Zempoaltepec) measures as follows: Wing, 57; tail, 60; culmen, 11; tarsus, 22.5.

Geothlypis trichas modestus, subsp. nov. SAN BLAS YEL-
LOWTHROAT.

Type, No. 157204, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. San Blas, Territory of Tepic, Mexico, June 12, 1897, E. W. Nelson and E. A. Goldman.

Distribution. — West coast of Mexico from southern Sinaloa south at least to Colima.

Subspecific characters. — Smaller than typical *G. trichas* from the eastern United States, with the green of back darker, more brownish olive and brownish flanks; black frontlet and white border to same nearly as in *G. t. occidentalis*.

Dimensions of type. — Wing, 52; tail, 49; culmen, 12; tarsus, 19.

General notes. — This small dark form is resident in the area given for its range and we took young birds at San Blas in June. The young as well as the adults are distinguishable by their dark color.

Thryothorus felix grandis, subsp. nov. MORELOS WREN.

Type, No. 142949, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Yautepec, Morelos, Mexico, January 18, 1893, E. W. Nelson.

Distribution. — Southwestern Puebla, Morelos and adjacent part of Guerrero.

Subspecific characters. — Much larger than the other forms of this species; paler than true *T. felix* and darker than the pale Sinaloa form.

Dimensions of type. — Wing, 60; tail, 61; culmen, 18; tarsus, 23.

General notes. — These Wrens are very common in brushy places of the arid and semitropical country they inhabit, and like their near relatives are very musical.

Harporhynchus curvirostris maculatus, subsp. nov.
SONORA THRASHER.

Type, No. 164734, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Alamos, Sonora, Mexico, December 23, 1898, E. A. Goldman.

Distribution. — Southern Sonora, northern Sinaloa and southwestern Chihuahua (on western slope).

Subspecific characters.—Most closely related to *H. c. occidentalis* from which it may be distinguished by its darker colors and smaller size.

Dimensions of type.—Wing, 105; tail, 115; culmen, 29; tarsus, 36.

General notes.—This is the darkest of all the races of *H. curvirostris* and has a heavy wash of brownish gray on the lower parts which becomes heaviest on the distinctly spotted breast. The abdomen and under tail-coverts are deep fulvous buffy washed with gray.

A NEW SUBSPECIES OF THE GENUS *HYLOCICHLA*.

BY REGINALD HEBER HOWE, JR.

SINCE I published my paper on 'The Ranges of *Hylocichla fuscescens* and *Hylocichla fuscescens salicicola*' in 'The Auk' for January, 1900 (Vol. XVII, No. 1, pp. 18-25), I have had quite a number of additional specimens sent me for examination and identification. These have forced me to recognize that a subspecific difference exists between the *Hylocichla fuscescens salicicola* of the West and the bird inhabiting Newfoundland, which in my former paper I referred to this same race. I noticed at that time that a slight difference did exist, but did not deem it worthy of separation; not being in favor of describing slight variations. I am now, however, of the opinion that the Newfoundland bird is subspecifically distinct from the western *salicicola*, though nearer this race than to *Hylocichla fuscescens*. This difference, now apparent, proves the necessity of having, in describing species and subspecies, very large series with which to work. My former paper was based on the examination of far more specimens than a great many of our recognized subspecies have been described from, and yet the addition to that series has proved that if the western race *salicicola* is recognized the race inhabiting Newfoundland also must be, or in other words that the former series of thirty-six specimens only barely suggested what the addition of eleven more specimens proves.

Hylocichla fuscescens fuliginosa, subsp. nov.

Type, from Codroy, Newfoundland, No. 46260, adult. Coll. of William Brewster. Collected May 31, 1895, by Ernest Doane.

Geographical Range.—Newfoundland (also possibly Anticosti and Labrador).

Subspecific Characters.—Size slightly larger. Upper parts, especially on the head, distinctly *brownish*, much darker and not of the tawny shade of typical *fuscescens*, and *lacking* the greenish tinge of *salicicola*. Throat, lores, and upper breast suffused with *buff*, though perhaps less so than in *fuscescens* (in *salicicola* buff is practically absent), the upper breast and usually also the throat spotted *heavily* with *broad* arrow-shaped brown markings suggesting very strongly the throat and breast of *H. u. swainsonii*. The breast markings of both *fuscescens* and *salicicola* are narrow and more penciled and lighter in shade. Bill darker and heavier.¹

Remarks.—The two specimens already recorded from Rhode Island, and the ones from Ottawa, Ontario, are referable to this race, as is also a male kindly loaned me by Dr. Louis B. Bishop, taken at New Haven, Conn., on September 23, 1895. The specimen recorded from Chester, South Carolina, is probably referable to this new race, rather than to *salicicola*. Another specimen sent me by Dr. Bishop from the Magdalen Islands, taken June 13, 1887, is intermediate between *fuscescens* and *fuliginosa*, although difficult to determine on account of being in worn, breeding plumage. Dr. Bishop has also kindly sent me an adult male (No 4116) taken May 6, 1899, in New Haven County, Conn., and an adult female (No. 4950) taken May 16, 1900, in the same locality, both referable to *fuliginosa*, and the first spring specimens from New England I have seen.

¹ For measurements see Tables with former paper. Auk, Vol. XVII, No. 1, pp. 22, 33.

AN ACCOUNT OF THE NESTING HABITS OF FRANKLIN'S ROSY GULL (*LARUS FRANKLINII*), AS OBSERVED AT HERON LAKE IN SOUTHERN MINNESOTA.¹

BY THOMAS S. ROBERTS, M. D.

[*With Photographs from Nature by the Author.*]

THE LOCALITY where the following observations were made is a great marshy lake far out in the vast prairie region of southwestern Minnesota. It lies in Jackson County, one of the most southerly tier of counties of Minnesota, and is fifty-six miles from the eastern line of South Dakota and thirteen miles from the northern line of Iowa. The southeastern end of the lake is at about 43° 45' north latitude, and 95° 20' west longitude. Heron Lake, with certain neighboring sloughs within a radius of ten or fifteen miles, is the southernmost station at which Franklin's Gull is known to nest. For many years after its first discovery in the Fur Countries by Dr. John Richardson, early in the third decade of the present century, it was considered to be a strictly boreal breeding species. And it was not until after the invasion of its nesting grounds at Shoal Lake and other Manitoban localities by Mr. Donald Gunn in 1867 that fragmentary accounts began to appear from time to time disclosing the fact that many little bands of these birds cut short their northward flight to make their summer home on the prairies of North Dakota and western Minnesota. To the present day little of definite character has appeared in our general works on ornithology in regard to the nidification of the species. Several short articles in collector's journals have appeared, most notable among them, and the source of much of the quoted information of late years, being an article by J. W.

¹ This article consists of extracts from a paper read at the meeting of the American Ornithologists' Union in Philadelphia, November 15, 1899. The original paper, somewhat elaborated and accompanied by a considerable series of illustrations from photographs from nature, is at present in course of publication by the Minnesota Geological and Natural History Survey.



FRANKLIN'S GULL ON NEST.

Preston on 'The Breeding of Franklin's Gull in Minnesota,' published in 1886 in the 'Ornithologist and Oologist' (Vol. II, p. 54). Preston's notes were based upon observations made during a visit to the Heron Lake colony several years previous to the first visit made by the writer. The material for the present article is the accumulation of three trips in three different years to the same general locality. On the last visit the Gulls were studied at intervals for a period of fifteen days, under most favorable and varied conditions, and a series of photographs embracing about one hundred negatives was secured, a selection from which is presented herewith. My companion on this latter expedition was Mr. Leslie O. Dart, and I wish here to acknowledge a by no means inconsiderable indebtedness to him for the successful issue of our work, especially in the photographic line. To his able coöperation is due very largely the beauty of the best of the illustrations accompanying this paper.

About the time of the final loosening of the ice in mid-April the vanguard of the Rosy Gulls arrives, and by the time the surface is clear they are coursing back and forth in great numbers over the broad expanse of open water that presents itself at this season of the year. The transients soon pass on or scatter to neighboring sloughs, and the Heron Lake Colony, proprietors by right of no one knows how many years of occupancy, select with much noisy consultation the location for the year. The mating contests over and settled, the busy, turbulent throng then begin the work of nest-building, which consumes the first few days of May, so that by the middle of that month the laying of the eggs has begun, and in three or four days thereafter the sets are complete, and the tedious task of incubation has begun. These dates are sometimes anticipated a little, while on the other hand a late season may cause delay, so that the depositing of the eggs may occur as early as the end of April or be postponed until the latter part of May. The Rosy Gull, like others of its family, nests strictly in colonies, and even on a lake as large as Heron Lake, all the individuals there resident congregate at one place and build their nests close together. But, unlike most birds breeding in colonies, the site chosen is rarely the same on any two successive seasons. Just why this should be so is not evident. It

seems to be due chiefly to an inherent fickleness on the part of the bird. This Heron Lake colony moves about from place to place, sometimes in the Upper Lake, sometimes in the Lower Lake, choosing locations in different years that may be miles apart, and varying to some extent in character.

Preston found them in 1886 at the extreme lower end of the lake, within sound and in plain sight of the village. In 1892 they settled on a spot further up the lake and close to the Herony. Here they built their nests among the standing bull-rushes fringing the open water, and a sudden rise in the level of the lake in early June broke most of their nests from their moorings, and they were carried by heavy winds out into open water and destroyed. The following year a location was selected close by the scene of this disaster, but considerably further in shore where the water was not over two feet deep and the growth of grass, flags and rushes, rank and thick, and so matted and bent by the snows of many winters that a safe and lasting harbor was insured. Here I visited them May 21 and 22 with Thomas Miller as guide, and found the nests of this colony of some two or three thousand Gulls placed so closely together that a dozen or more could easily be reached at one time from a small skiff forced in almost anywhere among them. While most of the nests were well built of reeds and rush stems, many of the birds had taken advantage of the secure and elevated foundations afforded by the broken down and matted vegetation to deposit their eggs in very indifferently put together nests. In this inside position, affording such good cover and so easily accessible from land, the birds were exposed to much annoyance by egg-hunting marauders, especially mink, judging from the number of despoiled nests observed.

After an unsuccessful attempt to find the Gulls in 1898, word came in May of the following year that they were once more at their old quarters and, equipped with photographic outfit and accompanied by Mr. Dart, the writer arrived at Heron Lake on the 12th of June. On the 16th we made our way in small hunting boats to the nesting ground, which on this occasion these fickle birds had chanced to locate some four or five miles from any available embarking point. Not a Gull was to be seen until



FIG 1. DISTANT VIEW OF A PORTION OF THE NESTING SITE OF THE FRANKLIN'S GULL COLONY AT HERON LAKE, MINN.



FIG 2 A PAIR OF FRANKLIN'S GULLS ON A FLOATING NEST.

the nesting site was almost reached. At last a few sentinels were sighted and as they announced our approach we rounded a final point of rushes into the comparatively open water of the upper lake (occasioned by recent floods) and there, spread out before us, a half mile distant, lay the object of our long and laborious search.

The surface of the water was everywhere dotted with dark little mounds and hundreds upon hundreds of Gulls filled the air above, circling round and round or hovering for a moment as they settled or rose in their incessant coming and going to and from the nests. And now our ears distinctly told us of the proximity of this interesting spectacle, for even at the distance of half a mile the harsh screams and rattling cries of the whirling mass of birds united to form a wild uproar that was very plainly audible. As we paddled quietly toward the scene of this confusion, and were getting ready our weapons for the noiseless attack we expected to make, the nearest Gulls soon espied us, and with redoubled outcry passed the word to all the rest. And now with one accord, the whole colony came streaming toward us—a few in the lead, but hundreds in the rear—until we were soon surrounded and accompanied the balance of our way by an immense wildly excited escort that by every means known to Gulldom, protested against the intrusion and tried in vain to impede our further progress. The frenzied, distressed notes and the furious dashes of the birds as they all but struck our heads excited both our pity and our admiration.

We made first a general reconnoissance of the entire nesting site.

At a distance of about an eighth of a mile from the marshy, reed-grown shore, the little floating mounds dotted thickly a great crescent-shaped area some three fourths of a mile in length by three or four hundred yards in the widest part. The nests were irregularly distributed. In some places there were many close together, and again they were scattered yards apart, while now and then there were large spaces where there were none at all.

Under ordinary conditions the water over all this area would have been two or three, nowhere over four, feet deep, with a thick growth of bull-rushes, (*Scirpus*) standing well above the surface. But heavy rains had raised the lake until the water was in

many places fully six feet deep and only the tops of the tallest rushes came into view; thus changing a large part of the nesting ground from a dense tangled bed of rushes into almost open water. Upon this condition of things the birds of course had not reckoned when they chose the site, and in consequence many of the nests were now torn from their moorings, having been lifted by the rising water, and were unprotected save by the weak tops of the submerged rushes. Thus free to drift, they were floating hither and thither at the mercy of the winds, but, strange to say, this state of things did not appear to greatly disconcert the owners. Here and there a number of nests had caught against some firm anchorage, and receiving new additions with each favorable breeze a windrow or island of these stray nests was soon formed. Nest touching nest in this manner resulted in a promiscuous crowding of families that must have tested the good nature and forbearance of the occupants not a little, and probably led to some vagaries in the care of the young described further on. A few nests had gone adrift entirely, and floating far out into the open water had been abandoned. But luckily a considerable part of the colony, wiser than their fellows, escaped this dire confusion or disaster as the result of having located their nests where shallower water and a stronger growth of rushes provided protection and safe anchorage even when the flood was at its height. From nest-building operations still in progress at the late date of our visit (June 16) we inferred that a few at least of the Gulls that had lost their homes were reëstablishing themselves in safer retreats further back, having perhaps learned a lesson against future similar mishaps.

The number of Gulls in the colony we estimated at between two and three thousand, and by counting certain areas, figured a total of about 1200 nests. Preston, in 1885, thought the colony then numbered 10,000, so that if he guessed anywhere near right, there has been a very considerable falling off in the fourteen years that have elapsed. In the six years between my two visits no appreciable diminution in numbers had occurred, so far as I could judge.

After completing our examination of the nesting ground as a whole, and so spreading consternation throughout the entire

colony, we settled down to quiet contemplation and study of the Gulls and their doings more in detail. All of two days and the greater part of a third day were thus spent, and what we saw in and about this bustling, ever changing community proved so engrossingly interesting and entertaining that the hours spent under a blazing sun within the narrow confines of little ducking boats glided rapidly by and proved all too short. The only discordant feature was the almost unbearably harsh and never ceasing outcry that rang continually in our ears. Now somewhat subdued for a few minutes, now breaking out again with redoubled energy, the wild chorus of shrill screams and cat-like calls made such a deep and lasting impression upon the listener that for many hours afterward it was utterly impossible to still the memory of the whole loud painful outcry.

The nests were all built of the same material — old water soaked bull-rushes — with sometimes a few fresh stems worked into the upper part. A heavy foundation of the thickest and longest rushes is first laid, forming a partly submerged platform held in place by the standing rushes about it, the whole being two to three feet across at the water line. Upon this the rather well made superstructure of finer material is constructed, with a long slope from the water's edge up to the rim of the nest, which is raised eight inches to a foot above the water. The cavity is eight to ten inches in diameter and three to four in depth, and is rudely lined with bits of fine rush tops and coarse grass. The inside is always perfectly dry, being several inches above the water. The variation in the nests was not very great, being merely as to general bulk and height. Much of the material of which the nests were constructed had been carried from a distance, probably from the neighboring shore where the rushes, loosened by the ice, had been cast up in heaps. The Gulls carry with apparent ease these great heavy rushes, and were often to be seen flying about for a considerable time with the long stems dangling from their bills. The nests were kept in good repair, and as they became trampled down or the rim disarranged the owners were to be seen putting things to rights or adding a new rush here and there as it was needed. At the time of our visit many young were already out of the shell, but there were also many

sets of eggs in all stages of incubation, the result probably of second nest-building.

The number of eggs in a nest varies from two to four, the most common clutch being three. They vary endlessly in both color and markings, and there is also a great diversity in shape. The ground color of the eggs varies from an unusual extreme of a very light grayish blue through many shades of umber, olive browns, and grayish browns to the other equally uncommon extreme of a very dark brown, approaching almost a chocolate in depth of coloration. Throughout there is a prevailing olive tint, giving a greenish cast, no matter what the body color. The eggs are marked with irregular blotches and pencillings of many shades of cinnamon brown and fuscous, the more deeply lying pigment producing spots of lilac or olive hue. In some eggs the markings vary little in size, and are evenly scattered over the entire surface; but usually they vary from fine dots to large blotches exceeding even a half inch in length, and are thickest at the large end, where they form a wreath, the markings becoming occasionally almost confluent. The irregular pencillings and scratches are confined for the most part to certain sets, and on some eggs nearly all of the markings are of this hieroglyphic character, giving to such the aspect of huge blackbird's eggs.

All the eggs of any one set have about the same ground color and the same general pattern in the markings, and so endless are the styles of coloration that no two sets of a large series are exactly alike. Yet so distinctive are the details of color and form of each set that should all the eggs of a considerable series become thoroughly intermingled it would not be a difficult matter to pick out accurately the different sets.

A rather blunt pyriform is the most common outline, but the extreme reaches on the one hand to an almost perfect ellipse, and on the other to a broad and rather pointed pear shape. The average measurements of a series of 138 eggs are 2.07 inches in length by 1.45 inches in breadth. The longest egg measures 2.29 inches, and the smallest 1.90, — a variation of .39 of an inch. The widest egg is 1.54 inches, and the narrowest 1.35, — a variation of .19 of an inch. The eggs of a set are generally of about the same dimension, and outline.

The exact period of incubation I am unable to state, but it is probably eighteen or twenty days. The chick liberates itself from the shell in the usual manner by cutting it neatly into halves, and the parents at once dispose of the fragments. The first downy plumage varies from a pale yellow to a soft grayish in color, with uncertain wavy markings of brown and blackish over all the upper parts. Some of the nestlings present a generally light appearance, while others are quite dark, but all of a brood are of the same general hue, and the same pattern of coloration. These pink-footed, pale-billed little balls of down now and then remain quietly in the home nest basking in the warm sunshine, but more frequently they are no sooner dry from the egg than they start to wander. A few are content to go no further than the broad sloping sides of the nest, and there they may be seen quietly dozing or tumbling about among the stems of the rushes as they explore the intricacies of their little island. The greater number, however, put boldly out to sea and drift away with the chance breeze, their tiny paddles of little avail as they pursue their now enforced journey. A gust of wind a trifle harder than usual, or a bump against a floating reed stem, and over they go bottom-side up, only to come quickly right again, dry and fluffy as ever. Having after many failures crawled over the tiny obstruction, they sail contentedly on. Now and then they get out to sea in earnest and disappear, and are probably lost in the rough waters of the open lake. Their departure from the nests was apparently ever against the will of the old birds, and many were the scoldings and severe the punishments meted out to these venturesome offspring. A glance in the direction of some local outburst of furious cries would reveal a bevy of Gulls crowded close together, beating the air and the water over a particular spot, where on closer inspection might be seen one or more of these hapless truants. The frenzy of the old birds as the chicks neared the open lake was pitiful to behold. With might and main they endeavored to turn them back, seeming not to realize their utter inability to stem the breeze even had they the inclination to make the attempt. At last, their protests of no avail, a resort is had to still more vigorous measures, and seizing the drifting chicks by the nape of the neck with the powerful beak they are jerked

bodily and roughly out of the water, and from a height of three or four feet thrown as far as possible in the desired direction. This being repeated time and again — often several old birds taking part in the performance — until the youngsters are at last flung into some nest, exhausted and bleeding from the blows and pinches inflicted by the sharp bills of the parent birds. This strange spectacle was of common occurrence, and these vigorous nursery duties seemed to occupy much of the attention of a goodly part of the members of this colony. Probably under ordinary conditions of water and protection such disturbances are less frequent. So far as the disciplining and care of the young went there existed a curious spirit of communism among these Gulls. An old Gull cared for whatever young Gulls fell in its way, and when the stray chicks chanced to clamber up into a strange nest, against which they happened to drift, they were after a few admonishing squawks welcomed as one of the household, and scolded, pecked, and fed just as though the foster parent had laid the eggs from which they were hatched.

Now and then an entire brood would escape in a body and crawling up beside some incubating bird on a neighboring windward nest would cuddle close about the old bird, who, to all appearances, was perfectly willing to adopt them in advance of the appearance of her own infants.

Occasionally we saw old Gulls already in possession of a family twice the size to which they were entitled, rushing out and pouncing upon other fresh arrivals, who were quickly hustled and jerked up among the others until not infrequently ten or a dozen of these tiny balls filled the nest to overflowing, and in the diversity of coloration presented plainly indicated their varied parentage.

Most jealously were these, foundling asylums watched over and many were the fierce encounters in mid-air that resulted when some marauding band dared to interfere. A single Gull, aided it might be by some accepted neighbor, fed apparently without distinction all these youngsters, and time and again we saw some little chap, just fished out of the water and still sore from the rough usage to which he had been subjected, fed to repletion by his captor, who disgorged into the tiny maw a juicy mass of dragon-fly nymphs brought from the meadow a mile away.



FIG. 1. A PAIR OF FRANKLIN'S GULLS WITH FOUR CHICKS.



FIG. 2. SCENE AT THE FRANKLIN'S GULL COLONY, HERON LAKE, MINN.,
JUNE 16, 1899.

The note of these little Gulls is a faint peep, but weak as it is, it contains a plain suggestion of the harsh scream of the adult, just as the nestling Grebe and gaudy little Coot mimic the cries of the parent.

With all this nest building, nest cleaning, and the varied parental duties devolving upon these birds of trim and delicate attire, they always appeared immaculately clean. As they stood on their nests, or hovered overhead facing the sun, the exquisite pink of the breast was plainly visible at a distance of fifty or sixty feet, and the picture they presented of dove-like beauty and grace of movement was unexcelled by anything we had seen elsewhere.

This superficial resemblance to a Dove, both when sitting and on the wing, is very great and has given rise to the popular name by which they are best known among the farmers through the region where they dwell — 'Prairie Dove.' Hovering lightly on the wing, resting buoyantly on the water, poising as they rise, or alight with upraised wings, or grouped about their nests they are the very perfection of grace and beauty and could not fail to attract the attention and elicit the admiration of the most indifferent of observers.

This colony of Franklin's Gulls had as associates and intimate neighbors many Coots, Pied-billed Grebes, Black Terns, a few Forster's Terns and, most notable of all, because so unexpected in this place, a colony of American Eared Grebes (*Colymbus nigricollis californicus*). There were a hundred or more of these latter birds and they had established themselves in the very midst of the Gull colony. Their nests, which were the very poorest structures that could be called by such a name, were disposed in two or three principal groups, were close together, and were intimately mingled with the Gulls' nests. Perhaps because they had drifted, some of them rested directly against Gulls' nests, but they had not been abandoned. The nests were partially submerged platforms of green vegetation pulled up from the bottom and were without even as much form and stability as is usually possessed by the rude structure of the Pied-billed. The eggs were half under water, and it seemed a marvel how they stayed on the loose platforms at all. They were only imperfectly covered. These Grebes, unlike their Pied-billed relatives, stayed close by their nests and for the most

part on them. When driven off they all swam rapidly away in a body and circled around at a safe distance, only to return immediately as soon as the coast was clear. In clambering up onto these frail nests they tipped and nearly sank the whole affair, but it nevertheless afforded sufficient support for them to lie for hours basking in the sun, often on one side, with the head held awkwardly up, and one leg waving clear of the water — a curious attitude, which it took us some little time to make out in detail with the aid of our glasses.

In conclusion a word may be said in regard to the food habits of Franklin's Gull. Everything goes to show that it, like most birds, eats that which is nearest at hand and easiest to get provided it is at all suited to its wants. During the nesting season at least, the food is almost exclusively insectivorous. The stomachs and gullets of several birds collected by the writer and kindly examined by Prof. Beal of the Biological Survey at Washington, contained a mass of insect débris to the exclusion of all else. One stomach alone furnished some fifteen different species, among them several varieties injurious to the interests of man. The chief part of the food, however, during the time of our visit to the colony, and that on which the young were largely fed, was the nymphs of dragon-flies which were then to be found in immense numbers in the meadows near by. The writer counted no less than three hundred and twenty-seven of these insects in a single stomach. Earlier in the season when the farmers are engaged in plowing, especially when 'breaking' the virgin prairie, many of these Gulls accompany the teams and eagerly contend with a horde of Blackbirds, Black Terns and other birds in securing the larvæ and worms turned up by the plow. Immense numbers of angle-worms, and many grubs of the cockchafer, are at times devoured in this way. Later in the season when grasshoppers have become plentiful the upland prairies and dry knolls become the feeding grounds and a diet of these ill-favored insects takes the place of all else. The aquatic life that is consumed as food is taken principally very early and late in the season and is probably of such a nature that it can in no way modify the conclusion that Franklin's Rosy Gull, besides being an object of great beauty and æsthetic value, has a prosaic and practical side revealed by the nature of

the food consumed, which shows it to be an eminently useful and beneficial bird worthy of all the protection that can be afforded it.

DESCRIPTION OF PLATES.

PLATE IX.

Franklin's Gull (*Larus franklinii*), standing on nest. From photograph taken at Heron Lake, Jackson Co., Minn., June, 1899. About $\frac{1}{3}$ natural size.

PLATE X.

Fig. 1. A distant view of a portion of the nesting site of the Franklin Gull Colony at Heron Lake, Minn. From photograph, June, 1899.

Fig. 2. A pair of Franklin Gulls standing on their floating nest. One egg and a chick visible. From photograph taken at Heron Lake, Minn., June, 1899. About $\frac{1}{3}$ natural size.

PLATE XI.

Fig. 1. A pair of Franklin Gulls with four chicks, in the act of following the parents from the nest. From photographs taken at Heron Lake, June, 1899. About $\frac{1}{15}$ natural size.

Fig. 2. Scene at the Franklin Gull Colony, Heron Lake, Minn., June 16, 1899. Shows in foreground a nest containing, besides the parent birds, twelve chicks, mostly 'waifs,' rescued from the water nearby.

NOTES ON A COLLECTION OF BAHAMA BIRDS.

BY OUTRAM BANGS.

IN THE early part of the year 1893, and again in the spring and early summer of 1897, Mr. C. J. Maynard collected a great many birds on some of the Bahama Islands — chiefly at Nassau, New Providence. Many of these have been distributed, but Mr. May-

nard put aside quite a number of the more interesting specimens that have since been kept together. This collection, numbering 337 skins, has just been acquired by my brother E. A. Bangs and myself.

It includes, besides many interesting things, the types of the four forms, *Colinus bahamensis*, *Speotyto bahamensis*, *Dendroica bahamensis* and *Hæmatopus prattii*,—named last autumn by Mr. Maynard.¹ These four forms appear to me to be perfectly good, but two of the names—that for the Pine Warbler and the Burrowing Owl—used by Mr. Maynard are preoccupied, and these must receive new names.

Most of the birds were taken at Nassau, New Providence, but there are a few from some of the other islands. Many of the species are represented by young in first plumage and some by adults in the worn, faded plumage of mid-summer. A few of the skins were made by Mr. H. J. Claridge, late in the summer of 1897, and sent to Mr. Maynard after he had himself returned home.

Following is a complete list of the collection. My only excuse for giving so many common species, that have been recorded again and again, is that it may be useful to working ornithologists to know where such things can be found in series.

1. *Sterna anæthetus* Scop. BRIDLED TERN.—One pair of adults both taken on Booby Rocks, May 21, 1897.

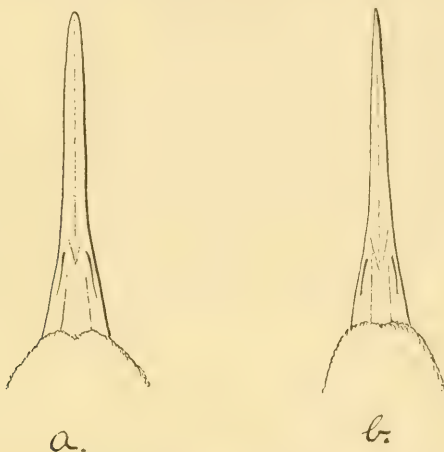
2. *Sterna dougalli* Montag. ROSEATE TERN.—One adult ♀ taken May 18, 1897 on North Key.

3. *Hæmatopus*² *prattii* Maynard. PRATT'S OYSTER-CATCHER.—Two specimens, cotypes of the species—a mated pair—taken April 29, 1893, on Flemmings Key, where they were about to breed. This strongly characterized species is a resident of the Bahamas, breeding locally throughout the islands. It is about the size of *H. palliatus*, but has larger, heavier tarsus and foot and a remarkably different bill; the bill of *H. prattii* being exceedingly broad and stout (see cut). *H. prattii* is paler throughout than *H. palliatus*, the brown of back lighter, the black of head and neck duller, and this latter color not extending backwards so far either above or below. I have compared the cotypes of *H. prattii* with an extensive series of skins of *H. palliatus* from many

¹ 'Appendix to Catalogue of the Birds of the West Indies.' Issued as a separate leaflet by Mr. Maynard Nov. 29, 1899. Reviewed by Dr. J. A. Allen, Auk, April, 1900, p. 187.

² Misspelled "*Hæmatopus*" by Maynard.

points along the south Atlantic coast of North America, chiefly in the collection of William Brewster, Esq., and cannot find a single individual



A. Bill of *Hæmatopus prattii* Maynard, adult ♂ cotype. (No. 3360, Bangs Coll.)

B. Bill of *Hæmatopus palliatus* Temm., adult ♂, from Frogmore, S. C. (No. 12492, Brewster Coll.)

Both one-half natural size.

of the continental form that even approaches them in the shape of the bill and the size of the tarsus and foot.

Measurements of H. prattii.

No.		Wing.	Tail.	Tarsus.	Middle toe with claw.	Breadth of bill at middle of nostril.
3360	♂ ad. Cotype.	254.	103.	61.	49.	12.
3361	♀ ad. Cotype.	258.	105.	64.	49.	12.

4. *Ægialitis wilsonia* (Ord). WILSON'S PLOVER. — Two specimens, both males, one taken on Little Pimlico, April 26, 1897, one on Andros, April 30, 1893. Neither of these is true *wilsonia*, — they are both intermediates between that form and *rufinucha*, though nearer *wilsonia*.

5. *Ægialitis meloda* (Ord). PIPING PLOVER. — One ♀ from Current Island, Eleuthera, May 1, 1897.

6. *Ægialitis semipalmata Bonap.* SEMIPALMATED PLOVER.—One ♀ from Nassau, April 2, 1897.

7. *Symphemia semipalmata (Gmel.)*. WILLET.—Four specimens, one from Current Island, Eleuthera, April 14, 1897, three from Fresh Creek, Andros, April 24, 1893.

The Willet breeds commonly on the Bahamas and these birds perhaps represent a local form. In size they are quite as small or smaller than true *S. semipalmata*, but in color they are very pale, agreeing more nearly in this respect with *S. semipalmata inornata* Brewster except that the dark spots on the under parts, though few in number, are much more distinct, and the pinkish-salmon suffusion and borders of the spots and markings usually seen in that strongly characterized form are wanting.

Measurements of S. semipalmata from the Bahamas.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Exposed Culmen.
3506	♂	Current Isl., Eleuthera.	195.	74.5	58.	54.
3509	♀	Fresh Creek, Andros.	194.5	76.	60.	57.
3507	♂	" "	183.	70.	54.5	51.5
3508	♀	" "	185.	69.	52.	52.

8. *Ereunetes pusillus (Linn.)*. SEMIPALMATED SANDPIPER.—One ♂ taken May 5, 1897, at Salt Key.

9. *Tringa minutilla Vieill.* LEAST SANDPIPER.—One ♀, Salt Key, May 5, 1897.

10. *Colinus bahamensis Maynard.* NASSAU BOB-WHITE.—Three specimens, all from Nassau, the cotypes of the species, which are a ♂ taken May 11, 1897, a ♀ taken April 1, 1897,¹ and another male taken June 2, 1897.

The Nassau Bob-white is a slightly differentiated island form, differing from *C. virginianus floridanus*, as Mr. Maynard has pointed out, in the narrowness of the black markings below, and the greater tendency of the markings to be arrow-shaped.

11. *Columbigallina bahamensis Maynard.* BAHAMA GROUND DOVE.—Twenty-two specimens, all from Nassau except one, an adult ♀, from Current Island, Eleuthera. This series includes birds taken from February to July, and five young in different stages of plumage.

12. *Zenaida zenaida (Bonap.)*. ZENAIDA DOVE.—Two males from Nassau, May 24 and July 13, 1897.

13. *Zenaidura macroura (Linn.)*. MOURNING DOVE.—Four skins, two males, two females, taken at Nassau, April 2 and 3, 1897.

¹ The cotypes are now Nos. 3356, ♂, and 3357, ♀, Coll. of E. A. and O. Bangs.

14. *Ardea bahamensis* Brewster. BREWSTER'S GREEN HERON.— One adult ♂ from Nassau, May 7, 1897.

15. *Speotyto cunicularia cavicola*, nom. nov. BAHAMAN BURROWING OWL.

Speotyto bahamensis Maynard; not *Speotyto cunicularia bahamensis* Cory, Auk, October, 1891, p. 349.

In my opinion the form of the Burrowing Owl found on the more northern Bahamas should be separated from the Florida form with which Cory unites it in his review of the group. Evidently Maynard overlooked Cory's review of the West Indian forms, as he not only did not mention that paper, but gave the New Providence bird the name Cory had used for the form found on Inagua.

The type of *S. cunicularia cavicola* (No. 3359, Collection of E. A. and O. Bangs) is an adult ♀ taken at Nassau April 6, 1897, by Mr. Maynard, with a set of six eggs. The nest was in a deep hole in the limestone rock. This skin, compared with an adult ♀ of *S. cunicularia floridana* from Manatee County, Florida, taken April 5, and therefore strictly comparable, shows the following differences. The Nassau bird is slightly larger, with heavier foot and tarsus; tarsus thickly feathered above; general coloration richer and redder brown; ground color below buffy, not white; the brown of back and the brown marking and spotting below Prout's brown (sepia in *S. c. floridana*).

The type of *S. cunicularia cavicola*, ♀ adult, measures, wing, 171.; tail, 76.; tarsus, 48.; middle toe, without claw, 21.; depth of bill, 13.2 mm.

An adult ♀ of *S. cunicularia floridana* from Manatee County, Florida, No. 884, Bangs collection, measures, wing, 161.5; tail, 63; tarsus, 44; middle toe without claw, 19; depth of bill, 12.4 mm.

16. *Strix pratincola* Bonap. AMERICAN BARN OWL. — Two specimens, — a pair of adults — taken August 4, 1897, by H. J. Claridge at Nassau. In order to settle the question of the identity of the Bahama Barn Owl, I sent these two skins to Dr. Ridgway, who kindly compared them for me with the large series in Washington. He wrote me as follows: "We can match your two Bahama specimens exactly with some in our series from Washington, Arizona, etc.; we also have a Bahama skin, very much resembling yours. The Cuban form (*S. fuscata*) is almost precisely like these Bahaman and occasional North American specimens except that they always have conspicuously light-colored (sometimes white) secondaries, contrasting strongly with the general color of the wing."

The Bahaman bird can therefore safely be called *pratincola*, although it appears to differ a little from the usual style of coloration of the continental form, this difference being in the direction of the Cuban *S. fuscata*.

17. *Crotophaga ani* Linn. ANI. — Ten adults, from Nassau, Current Island, Eleuthera, and Andros Island, taken from April 14 to July 28.

18. *Saurothera bahamensis* Bryant. BAHAMA CUCKOO. — Ten specimens, all from Nassau. This series includes adults in fresh plumage and in worn mid-summer dress, taken on dates ranging from February 13 to July 25, besides three young specimens in nestling plumage taken June 19, July 2 and July 7. The young differ from the adults only in having the throat and breast a little paler in tone, and in entirely lacking the black bars in the tail.

19. *Coccyzus minor maynardi* Ridgw. MAYNARD'S COCKOO. — Nine specimens, all from Nassau, including adults taken in June, July and August, and one nestling taken June 23, 1897. The nestling plumage appears to differ from that of the adult chiefly in the coloring of the tail, the four outer rectrices in the young bird not being distinctly black basally, but dull dusky brown with the white ends less purely white and deeper.

20. *Dryobates maynardi* (Ridgw.). MAYNARD'S WOODPECKER. — Ten specimens, all from Nassau, adults, taken from February 12 to August 22, and two nestlings, ♂ and ♀, taken respectively June 10, and June 11, 1897. The nestlings show the character that separates this island form from the mainland Hairy Woodpecker — the white lores connecting the superciliary stripe with the whitish nasal tufts — quite as strongly as do the adults.

21. *Chordeiles minor* Cab. LITTLE NIGHTHAWK. — One ♀, taken at Nassau, May 13, 1897.

22. *Doricha evelynæ* (Bourc.). BAHAMA WOODSTAR. — Ten specimens — eight from Nassau, two from Current Island, Eleuthera.

23. *Pitangus bahamensis* Bryant. BAHAMA KINGBIRD. — Two males from Nassau, March 2 and June 3, 1897.

24. *Blacicus bahamensis* (Bryant). LEAST BAHAMA FLYCATCHER. — Ten specimens, all from Nassau, adults, taken from March 6 to June 19, and one nestling taken May 24, 1897.

25. *Myiarchus leucaysiensis* Bryant. RUFOUS-TAILED FLYCATCHER. — Five specimens, from Nassau, March 10 to June 24.

26. *Tyrannus dominicensis* (Gmel.). GRAY KINGBIRD. — Six specimens, from Nassau, May and June.

27. *Callichelidon cyaneoviridis* (Bryant). BAHAMA SWALLOW. — Eight specimens, seven males, from Nassau, all taken on March 8, 1897; one ♀ from Current Island, Eleuthera, April 24, 1897.

28. *Vireo calidris barbatulus* (Cab.). BLACK-WHISKERED VIREO. — Thirty-one specimens, all from Nassau but one, which was taken on Current Island, Eleuthera, April 30, 1897. The Nassau examples were taken in May, June and July.

Mr. J. Lewis Bonhote in reporting on a small collection made by himself on New Providence,¹ calls his specimens true *calidris*; to this I can not agree.

¹ Ibis, October, 1899, pp. 511-512.

The bird goes through a curious change in color, during the summer, without molt. In early May (10th to 15th) it is in fine plumage with green back and gray pileum; gradually as the season advances the gray color fades to a rusty brown which in July specimens covers the whole pileum and sides of head and neck and spreads over the back nearly to the rump.

29. *Vireo crassirostris* *Bryant*. THICK-BILLED VIREO.—Twenty-one specimens, all from Nassau, adults taken in February, March, April and May, and four nestlings taken June 24 and 25.

This series shows a wide range in color, from very dull colored examples to some nearly as bright as *V. crassirostris flavescens*, though none are quite as highly colored as that form. Dr. Ridgway kindly compared this series with the type of *V. crassirostris*, which is in the National Museum, and wrote me that it (the type) is about half way between the dull-est and brightest individuals in our series.

30. *Mimus gundlachii* (*Cab.*). GUNDLACH'S MOCKINGBIRD.—Ten specimens, six from Nassau, four from Highbourne Key, March and April.

31. *Galeoscoptes carolinensis* (*Linn.*). CATBIRD.—One adult ♂ from Nassau, March 4, 1897.

32. *Mimocichla plumbea* (*Linn.*). PLUMBEUS MOCKINGBIRD.—Ten specimens, all from Nassau, including adults taken from February 8 to March 24, and two young examples in nestling plumage taken August 15 and August 20, 1897.

The nestlings have the throat thickly spotted with dusky and the rest of the underparts sparsely spotted with dusky brown; the wing-coverts somewhat spotted with light brown.

33. *Polioptila cærulea cæsiogaster* (*Ridgw.*). BAHAMA GNATCATCHER.—Seven adults from Nassau.

34. *Geothlypis trichas* (*Linn.*). MARYLAND YELLOW-THROAT.—Six specimens from Nassau and Current Island, Eleuthera, taken from Feb. 8 to April 13.

35. *Geothlypis restricta*. *Maynard*.¹ BAHAMA YELLOW-THROAT.—Eight specimens, from Nassau, Hog Island and Salt Key, February 8 to May 5.

I use this name for the smaller Yellowthroat that winters on the Bahamas; it certainly is a different form from *G. trichas*, and some day its breeding range will be known.

When Mr. Maynard described this form he believed that it bred on New Providence; since then he has ascertained that it does not breed on that island, at least, though it lingers very late,—into early May. Besides the differences in color and extent of the black markings, *G. restricta* averages smaller than *G. trichas*. (The wing of *G. trichas*, in a very large series I have just measured, runs from 55 mm. to 59 mm. In the

¹ *Geothlypis restricta* Maynard, American Exchange and Mart, December 15, 1886.

series of eight examples of *G. restricta* the wing measures from 53 mm. to 55 mm.)

36. *Geothlypis rostrata* Bryant. GREATER YELLOW-THROAT.—Eleven specimens, ten males, one female, taken from February 6 to June 27, 1897, at Nassau.

It has always been supposed that the large Yellow-throats of the Bahamas were representative island forms, — *G. rostrata* on New Providence, *G. coryi* on Eleuthera, *G. tanneri* on Abaco, and a form as yet undescribed on Andros.¹ It is therefore a great surprise to find that *two species breed on New Providence*, and one other, *G. coryi*, has been taken there once, though it was probably only a straggler. It is to Mr. Maynard's great acuteness as a collector that this unlooked for discovery is due. Mr. Maynard has taken these skulking, retiring birds in larger numbers than any one else who has visited the Bahamas. While collecting them in 1897 at Nassau he noticed two different songs, and making notes on the birds he shot, soon found that two distinct species were breeding equally commonly there. The smaller, duller colored bird, *G. rostrata*, sings like a Maryland Yellow-throat. The larger, more highly colored species, sings like *G. coryi*, — a song so different that Mr. Maynard says, no one on first hearing it would take it for the performance of a Yellow-throat.

37. *Geothlypis maynardi*,² sp. nov. MAYNARD'S YELLOW-THROAT. — Thirteen adult males from Nassau, New Providence, taken from February 8 to June 24, 1897.

Type, from Nassau, New Providence, No. 3363, ♂ adult, collection of E. A. and O. Bangs, collected May 11, 1897, by C. J. Maynard.

General characters.—Most nearly like *G. coryi*, differing from that species in having the black mask bordered behind by ash-gray, becoming paler and more yellowish behind the eye, the occiput dark ash, and the upper parts dull olive green more nearly as in *G. rostrata*; can be told from *G. rostrata*, with which it occurs, by larger size and much brighter colors, the whole underparts being bright yellow. In *G. rostrata* the throat and breast are pale yellow, the belly whitish and the flanks and sides dull brownish green. Song wholly different from that of *G. rostrata*.

Color.—Adult ♂ (♀ unknown) with black mask about as in the allied forms, bordered behind by ash-gray which becomes yellowish ash from behind the eye downwards; occiput dark ash, many of the feathers bordered by olivaceous; rest of upper parts, including the edges of the wing feathers and the tail, dull olive-green; whole under parts bright gamboge yellow, the sides slightly more olivaceous.

Remarks.—Dr. Ridgway kindly compared our series of Yellow-throats for me with the material at Washington. This was a necessity, as the

¹ See Allen's note after *Geothlypis rostrata* of Northrop's list, Auk, January, 1891, pp. 68-69.

² Named in honor of C. J. Maynard.

type of Bryant's *G. rostrata* is in the National Museum, and of course the question arose, as to which of the two species breeding on New Providence Bryant's name applied. *G. rostrata* proves to be the smaller, duller colored bird.

Measurements of G. rostrata Bryant.

No.		Sex.	Wing.	Tail.	Tarsus.	Exposed culmen.
3377	Topotype	♂	61.	56.	22.	16.
3378	"	♂	62.5	59.	22.	16.
3379	"	♂	62.5	59.	22.2	17.
3380	"	♂	60. ¹	55.5	21.8	16.
3381	"	♂	64.	59.	22.2	16.2
3382	"	♂	61.5	57.5	21.6	16.
3383	"	♂	62.	58.	22.	16.
3384	"	♂	62.	56.5	21.6	16.
3385	"	♂	62.5	57.5	21.4	16.2
3386	"	♂	61.5	56.5	22.	17.
3375	"	♀	59.	53.	21.	15.8

Measurements of G. maynardi Bangs.

No.		Sex.	Wing.	Tail.	Tarsus.	Exposed culmen.
3362	Topotype	♂	66.	57.	22.2	16.2
3363	Type	♂	66.	61.	22.2	16.
3364	Topotype	♂	65.	60.	21.8	15.8
3365	"	♂	66.	60.	22.	16.
3366	"	♂	65.5	59.	21.6	16.
3367	"	♂	66.	60.	22.	16.2
3368	"	♂	65.	57.	22.	16.
3369	"	♂	64.	58.	23.	16.8
3370	"	♂	64.	58.	22.4	17.
3371	"	♂	66.5	57.	22.	16.2
3372	"	♂	65.5	57.5	23.	16.
3373	"	♂	66.5	58.	22.2	16.

¹ Wing somewhat worn, the measurement, therefore, is a little too short.

38. *Geothlypis coryi* Ridgw. CORY'S YELLOW-THROAT.—One adult ♂ taken July 7, 1897, by H. J. Claridge at Nassau. This specimen is without any doubt *G. coryi*. Taken so late in the summer, after the breeding season, it is probably a straggler, that in some way wandered over from Eleuthera. Dr. Ridgway has seen the skin and agrees with me that it is certainly *G. coryi*.

39. *Seiurus aurocapillus* (Linn.). OVEN-BIRD.—One ♀ from Nassau, February 6, 1897.

40. *Dendroica tigrina* (Gmel.). CAPE MAY WARBLER.—Ten specimens, one from Nassau, and nine from Current Island, Eleuthera, taken from April 20 to April 27.

41. *Dendroica petechia flavivertex* Chapman. CHAPMAN'S WARBLER.—One adult ♂ from Nassau, May 7, 1897.

42. *Dendroica kirtlandi* Baird. KIRTLAND'S WARBLER.—A pair of adults, ♂ taken April 5, ♀ March 4, 1897, both at Nassau.

43. *Dendroica achrustera*,¹ nom. nov. BAHAMA PINE WARBLER.

Dendroica bahamensis Maynard, not *Dendroica pityophila bahamensis* Cory, Auk, October, 1891, p. 348.

Five specimens, including the cotypes of the species, a mated pair taken March 6; an adult ♀ taken March 20; an adult ♂ taken March 24; a young, in nestling plumage, taken May 28, —all at Nassau.

The New Providence Pine Warbler is a very distinct island form. The adult ♂ differs from the adult ♂ of *D. vigorsii* in having the throat and breast pale yellow (about pale lemon yellow); belly and under tail-coverts soiled white; flanks and sides brownish; the upper parts much duller—more brownish, less greenish. The adult ♀ differs from the adult ♀ of *D. vigorsii* in being much duller and browner below with very little yellow on throat and this of a very pale shade; upper parts dull olive brown instead of greenish.

The nestling differs from any nestlings of *D. vigorsii* I have seen, in having the back a color very near cinnamon-rufous (this region in nestlings of *D. vigorsii* being, usually, about sepia).

D. achrustera is a smaller bird than *D. vigorsii*, as shown by the following measurements:

Measurements of D. achrustera Bangs.

No.		Sex.	Wing.	Tail.	Tarsus.	Culmen.
3351	Cotype	♂ ad.	64.	52.	18.4	12.
3353	Topotype	♂ ad.	64.	53.	18.4	12.2
3352	Cotype	♀ ad.	63.	51.	18.6	11.4
3354	Topotype	♀ ad.	62.5	50.	18.6	12.

In adult males of *D. vigorsii* I find the wing measures not less than 70 mm. and often exceeds this by several mm.

44. *Dendroica palmarum* (Gmel.). PALM WARBLER.—One ♂, Nassau, April 26, 1897, a late date for this species.

¹ Αχρούστερα=less highly colored.

45. *Dendroica discolor* (Vieill.). PRAIRIE WARBLER. — Five specimens, from Nassau, Sandy Key and Current Island, Eleuthera, February 25, March 24 and April 20.

46. *Cœreba bahamensis* (Reich.). BAHAMA HONEY CREEPER. — Twelve specimens, seven adults from Nassau, an adult ♂ and two nestlings from Current Island, Eleuthera — the adult taken April 22, and the young April 20 and April 27 — and two adult males from Highbourne Key, April 8.

47. *Spindalis zena* (Linn.). BAHAMA FRUIT FINCH. — Nineteen specimens, all from Nassau, taken from February 12 to June 24.

48. *Euethia bicolor* (Linn.). GRASSQUIT. — Ten specimens, all from Nassau; adults taken from February 6 to June 7, and one nestling taken June 16.

49. *Pyrhulagra violacea* (Linn.). PURPLE GROSBEAK. — Sixteen specimens from Nassau, Current Island, Eleuthera, and Highbourne Key, taken from February 12 to July 1.

50. *Passerculus sandwichensis savanna* (Wils.). SAVANNA SPARROW. — Three specimens from Nassau, taken March 3 and April 1, 1897.

51. *Agelaius bryanti* (Ridgw.). BAHAMA RED-WING. — One adult ♂. taken at Fresh Creek, Andros, May, 1897.

GENERAL NOTES.

The Red-necked Grebe in Michigan in Winter. — On the 12th of this month (March, 1900) a fine female specimen of the Red-necked Grebe (*Colymbus holballii*) was picked up in a frozen condition on a lake two and one half miles west of this city. In skinning it I found that one of the radii had been fractured by a shot. The wound had healed externally and the bone had fused, showing that it had been injured before the winter set in and had been unable to take its departure, as it otherwise would have done, and this accounts for its presence at such an unusual period. This bird is of very rare occurrence in Michigan. It is now in my collection. — PERCY S. SELOUS, *Greenville, Mich.*

The Dovekie (*Alle alle*) on the Coast of Virginia. — Two Dovekies (*Alle alle*) were shot from a blind Dec. 13, 1899, about one mile west of Killick Shoal Light, in Chincoteague Bay, Virginia, by Wm. H. Cookman of Germantown, Philadelphia. The birds were positively identified and it was stated by R. T. Taylor, a resident gunner during the past twenty years, that he had never seen any birds like them before in that locality. There were four birds in the flock. — WM. L. BAILY, *Ardmore, Pa.*

The American Egret in Connecticut.—On the 28th of July, 1899, a fine specimen of the American Egret, *Ardea egretta*, was brought me, having just been shot from a tree on the shore of a small pond in this town, Kent. As the person in question passed near the pond, the great white bird flew up from the shore, alighted on a low tree close by, remaining until he returned from the house with a gun, and manifesting no shyness. It was a male, but whether old or young I could not decide, as, though without plumes or long feathers, it was of full measurements, and showed no lingering adolescence. This occurrence, forty miles inland, is probably much more unusual than the appearance of this species on Long Island Sound.—REV. HERBERT K. JOB, *Kent, Conn.*

Notes on the Nesting of the Blue-throated Hummingbird.—On February 16, 1899, while at a place called Las Minas, which is about five miles north of Las Vigas, Vera Cruz, Mexico, I found the nest of a Blue-throated Hummingbird (*Coeligena clemenciae*). The place was in a cañon and the elevation was about 4500 feet.

On February 12 we had snow, with thermometer down to 32° F. at 4 p. m., and on February 13, at 7 a. m., down to 29° F. All the plants and trees were covered with ice, and the leaves of almost everything were killed; we found many frozen birds, and that was the fate of the owner of this nest. We only had two cold days, but that was enough to destroy many birds.

The nest was fastened to a vine one tenth of an inch in diameter and about three feet above a small stream of water. The vine hung from a large rock and the nest was one and a half feet from the rock, and would have been sheltered from rain by the overhanging rock. The nest is of bulky structure, and is perhaps a new nest built on top of an old one. It is composed of fine moss massed together, and bound with spiders' webs or similar material. It measures, outer diameter, 2 $\frac{3}{4}$ inches, depth 4 inches; inside diameter, 1 $\frac{1}{4}$ inches; depth, $\frac{3}{4}$ inch. There is very little lining, only enough for the eggs to rest on, consisting of down from some fern.

The two dull white eggs, elliptical oval in shape, measure .61×.35 and .62×.40 inch. The nest and eggs are now at the Smithsonian Institution.—JOSIAH H. CLARK, *Paterson, N. J.*

Evening Grosbeak (*Coccothraustes vespertinus*).—This beautiful and dignified looking bird was exceedingly common in the city of Milwaukee, during the months of February and March, as many as thirty and forty often being seen in one flock. They frequented the box elder trees, which were covered with an unusual supply of seeds even in the densely populated parts of the city. One morning—the thermometer registered 20° below zero—while walking down Cedar Street I found the whole sidewalk underneath a fine old box elder covered with the broken parts

of the seeds. Almost at the same moment I heard a soft and very melodious *cheep*, and on looking up into the tree I beheld a flock of thirty-nine of these strangely beautiful birds. They were very silent and quite unsuspicious. Only now and then a soft *cheep-cheep* was uttered by one or the other of the party. When they were alarmed they uttered a rather sharp and quick *chip* and then all took wing. One morning I found a few on a mountain ash where they evidently were feeding on the seeds of the dry fruit. They were only seen early in the morning, never later in the day. In the West Park, a place where the birds are always protected, they were rather abundant during the months mentioned.—H. NEHRLING, *Milwaukee, Wisc.*

Feeding Habits of the Pine Siskin.—Mrs. W. C. Horton, president of the Brattleboro, Vt., Bird Club (a branch of the American Society of Bird Restorers), and a member of this Society's patrol, reports that on April 14 of this year, Pine Siskins (*Spinus pinus*) were observed feeding on the seeds of cones in a pine grove near her Brattleboro home. Two young Siskins were also noted, apparently just out of the nest. These youngsters were assiduously fed by at least one of the parents, but with *what* was not clear. Several feedings occurred and between them the parent procured no visible supply of food. To the observers it seemed highly probable that the feeding was done by regurgitation.—FLETCHER OSGOOD, *Boston, Mass.*

Large Flight of White-winged Crossbills on Long Island, N. Y.—The Red Crossbills, *Loxia curvirostra minor*, are more or less regular in their appearance on Long Island each year and occasionally breed there, but the presence of the White-winged Crossbill, *Loxia leucoptera*, is of such rare occurrence, that I consider their appearance in such large numbers during the past fall and winter worthy of note.

Capt. James G. Scott presented me with a fine adult male of this species that he shot on the 7th of November from a flock of seven or eight at Montauk Point, L. I. The next evidence of their presence that came to my notice was on the 20th of November, when I met with them in large numbers. Between Mount Sinai Harbor and Long Island is a long strip of beach and low sand ridges; on the harbor side these are covered with a scattering growth of bushes and dwarfed red cedars. The hills on the eastern side of the harbor are covered with a thick growth of red cedars, and it was in this vicinity that most of the birds were noticed. There was a strong northwest wind blowing at the time and the birds were flying very low, many of them just clearing the tops of the trees and bushes. Most of the birds were noticed between 9 A. M. and 12 M. During this time thousands of Pine Finches, Goldfinches and White-winged Crossbills were passing westward, occasionally in mixed flocks, but each species appearing to keep in groups by themselves. Between the hours men-

tioned there was an almost continuous succession of flocks containing from three or four to as many as one hundred and fifty or two hundred birds in a flock. Their notes, quite unlike those of their red cousins, remind one more of the twittering notes which the Pine Finch utters when feeding. Two or three flocks of Red Crossbills were also noted.

November 21, I again visited the same locality and several hundred 'White-wings' were seen, but very few compared to the numbers seen on the previous day, and all were flying very high. On both days they appeared to be very restless, and when called down would alight in the tops of the cedars. After picking for a moment or two as if in search of food and finding none they would at once resume their journey westward across the harbor. Sixteen specimens were examined and all were in good flesh; their stomachs contained only a little sand and traces of vegetable matter. All of those seen appeared to be adults except one female taken, whose skull indicated immaturity. The red males appeared to be the more numerous.

November 22 again found me in the same locality, but only a single 'White-wing' was seen, this was in company with a flock of Goldfinches. On several occasions from this time on until the 20th of February, when I left Millers Place, single birds or a small flock would be seen, but I think very few spent the winter on the island.

The Red Crossbills (*Loxia curvirostra minor*) were also more numerous than usual during the past winter, and I think a few remained and bred on the island. May 6, two small flocks were noticed among the pitch pines south of Millers Place, one flock of six containing five red males and one female. The following day I procured a female in worn plumage, whose ovaries indicated that they had recently been in an active state. — ARTHUR H. HELME, *Brooklyn, N. Y.*

The Lark Finch and Baird's Bunting on Long Island, N. Y. — An adult male Lark Finch, *Chondestes grammacus* was taken at Millers Place, Long Island, Nov. 27, 1899. It was first noticed feeding in a clump of rag-weeds in company with a small mixed flock of Song, Fox and Tree Sparrows.

At Montauk Point, L. I., Nov. 13, 1899, I secured a small Sparrow that proves to be *Ammodramus bairdi*. The sex I was unable to determine, as it was too badly injured by shot. Dr. Jonathan Dwight, Jr., who has examined the specimen, writes me that it is "chiefly in juvenal plumage passing to first winter." So far as I am aware this is the first instance of its occurrence that has been reported from the Atlantic coast. — ARTHUR H. HELME, *Brooklyn, N. Y.*

Bachman's Sparrow in Virginia. — In May, 1897, I took a pair of Bachman's Sparrows (*Peucaea aestivalis bachmani*) on Blackwater Creek, Campbell County, Va., together with their nest and eggs. This was the

first record of the occurrence of the species so far north, the other record being the specimen recorded from Maryland by Mr. Figgins.

I have recently learned that the species is a common summer resident in Albermarle County, Va., where Mr. Rufus Barringer, of Charlottesville, took several birds and their nests and eggs last summer. It seems now that the species is a fairly common summer resident in the State. No doubt it will be found nesting abundantly in southeastern Virginia if the proper territory is searched. But already its status as a Virginian summer resident is well established, first by my record, and now by Mr. Barringer's 'take.' — JOHN W. DANIEL, JR., *Lynchburg, Va.*

Louisiana and Mississippi Bird Notes. — On March 19, 1898, while on a collecting trip in Jefferson Parish, across the Mississippi from New Orleans, I noticed what seemed to be a dull-looking Finch in the upper branches of a small tree, feeding on the buds. I shot it, and was astonished to find it a young male Louisiana Tanager (*Piranga ludoviciana*). It was in rather dull, but not worn, plumage, and the adult red was beginning to show on the loreal and mental regions. Besides being so far from its usual course of migration, it was very early, April 2, being the earliest date for the arrival of either of our other Tanagers, *Piranga rubra* putting in its appearance on that date in 1898.

On a collecting trip in Amite County, Miss., my brother, W. B. Allison, and myself, saw several Thrushes on Sept. 18, 1897, that we took for *Hylocichla fuscescens*; two specimens were secured, but, owing to bad condition of the birds, and to lack of time, only one was skinned. Two of the birds were seen the following day.

The specimen in question was recently identified by Dr. Fisher as *Hylocichla fuscescens salicicola*; this greatly extends the range of this subspecies, and the fact that more than one was seen lends additional importance to the record.

Rowing across the bay in front of Bay St. Louis, Miss., on May 11, 1899, I was very much surprised to see a Loon (*Gavia imber*), sitting on the water a few hundred yards distant. I was at first rather loth to believe that this species could be on the Gulf Coast so early in the season; but the bird remained all through the fall, and I frequently watched it, and heard its unmistakable, weird laugh. As nearly as I could tell, it was a young male.

On August 23, of the same year, I saw two Black-bellied Plovers (*Charadrius squatarola*), feeding singly, together, or with Spotted Sandpipers (*Actitis macularia*), at different times of the day. There is nothing remarkable about the fact that the Plovers were there, but the most interesting thing was that both, which finally flew by me within thirty or forty feet, were in *full black-bellied plumage*, showing that, unless by color change and not molt, the black does not pass away in the fall specimens. — ANDREW ALLISON, *New Orleans, La.*

Seven New Birds for Colorado.—*Gavia arctica*. BLACK-THROATED LOON.—Three small Loons were observed on Prospect Lake in the suburbs of Colorado Springs in November, 1898, and all were shot by a local gunner. One which I subsequently examined proved to be of this species. I also examined in 1883 a specimen killed, I think, the previous fall near Colorado Springs. Colorado is within the probable winter range of the species and it may be a regular visitant.

Ardea egretta. AMERICAN EGRET.—On May 12, Mr. A. Gruber and Mr. F. Cikauck, taxidermists in my employ, reported seeing a single bird in a tall cottonwood tree five miles south of Colorado Springs. As they are familiar with this species, as well as with the more common *A. candidissima*, there appears no reason to doubt their identification.

Syrnium nebulosum.—BARRED OWL. In March, 1897, Mr. B. G. Voight found a pair of these Owls breeding near Holyoke, in the north-eastern corner of the State. Two eggs somewhat incubated and one of the birds were secured.

Astragalinus tristis pallidus. WESTERN GOLDFINCH.—This paler Western Goldfinch occurs in Colorado as well as the typical eastern form, to which all have heretofore been referred.

I am not able at present to define their relative range or abundance with certainty. *Pallidus* is an early spring migrant along the eastern base of the mountains and quite likely may be the alpine breeder. *Tristis* probably is a summer visitant from the southeast, occupying the plains to the base of the mountains. I have obtained both forms at Colorado Springs, and *tristis* one hundred miles eastward. Examples of both forms which I recently sent to the American Museum of Natural History, have been kindly identified by Mr. Chapman with the concurrence of Dr. Allen.

Geothlypis agilis. CONNECTICUT WARBLER.—On May 24, 1899, I shot a male in a clump of willows bordering a water hole at Lake, Lincoln County, about eighty miles northeast of Colorado Springs. This unexpected capture adds an interesting eastern bird to the fauna of Colorado, and extends the known range of the species several hundred miles to the westward.

Geothlypis trichas. MARYLAND YELLOW-THROAT.—The Yellow-throats of Colorado exhibit a great range of variation. The majority are clearly *occidentalis* but among the later arrivals are some that are nearer typical *trichas*. A male collected at Colorado Springs May 31, 1898, which I submitted to Mr. Ridgway he refers to this form.

Wilsonia canadensis. CANADIAN WARBLER.—The range of this species is extended westward nearly to the Rocky Mountain Range by my capture of a male at Lake, Lincoln County, May 23, 1899.—CHARLES E. AIKEN, *Colorado Springs, Col.*

Bird Notes from Sao Paulo, Brazil.—Mr. Adolph Hempel, assistant curator of the Museu Paulista, Sao Paulo, Brazil, a young American

naturalist, in a private letter speaks about the rural bird life of his locality as follows:

"The Canario of the Brazilians, *Sycalis foveola* Pelz., is found in this State. Right near Sao Paulo it is rare. Indeed nearly all the birds are killed by the Italians, who use them as food, and it is difficult to find a dozen species near the city. In the country, however, and especially about the farms and buildings the Canario is quite common.

The two commonest birds about Sao Paulo are *Troglodytes furvus* Wied (Curruira), and *Zonotrichia pileata* Pelz. (Tico-tico). On the farms one also finds *Sycalis flaveola*, *Turdus leucomelas* Vieill. (Sabiá), *Mimus* spec., *Milvulus tyrannus* (L.) (Tesoura), *Pitangus sulphuratus* (L.) (Bemtevi), usually one or two Woodpeckers, occasionally a Tucano, and often several species of Paroquets and Parrots, such as *Psittacula passerina* (L.), the Tuim; *Brotogerys tirica* (Gm.), the Periquito; *Pionus maxmiliani* (Kuhl.), the Maitacca.

"A person who is accustomed to the variety of bird forms in the northern woods is struck with the absence of birds in the Brazilian forest, and yet many birds abound, for over five hundred species are recorded from the State of Sao Paulo alone. But the birds seem to be more solitary here. They do not sing and chatter at daybreak as they do in the United States. I have been in camp in the virgin forest, ten miles away from any house, and have not heard a note of a bird all day. One bird, however, the Tangara, *Chiroxiphia caudata* (Shaw), a beautiful small bird of blue plumage and red head, will congregate in numbers, especially during the mating season, and sing and hop and dance for hours at a time. I have often enjoyed watching them and listening to their songs."
— H. NEHRLING, *Milwaukee, Wisc.*

Sanitary Habits of Birds.—I read, in the April Auk, Mr. F. H. Herrick's article on the sanitary habits of birds and was much pleased and profited by it. I was disappointed in one respect only—that was that it did not throw any confirmatory light upon a recent observation of my own which had puzzled me a little.

Late last summer I was watching a pair of Baltimore Orioles feeding their young, when I saw the male take a soft white pellicle from the open and extended mouth of a nestling, and drop it some yards from the nest.

This was new procedure to me, and I began at once to review the subject of feeding habits, as it was noted in my scant library, but I could find nothing about it. While I was about to doubt my own eyes (at thirty feet through a good opera glass) I received a letter from Mr. H. B. Rugg, of Vermont, saying that some friends of his had been watching some Robins as they fed their young, and had seen the parents take some round white substance from the throats of the nestlings; and they wanted him to tell them what this was. Then he wrote and asked me what it was.

It seemed quite a coincidence that he should pass this query on to me just when I was suffering for similar information, but it confirmed my observation. Since it is well known that pellets of indigestible things are frequently thrown up by some young birds, the best that I could suggest was that this might be these same things, which, in regurgitation, had taken on the form of the usual dejections; but not being able to see any of these pellicles after they were dropped, I, of course, could not be sure. Cannot Mr. Herrick, or some close student of the habits of birds tell us something of *this*?

I had hoped to observe further before mentioning this, but my opportunities are very limited: so I concluded that I had better note it in the July 'Auk,' so that the host of nest watchers this season may, if they please, be on the lookout for the matter. So far this year I have seen nothing of the sort in casually watching two nests of Robins in my yard.

By the way, the male Oriole noted sometimes regurgitated food to the young, but the mother always came with a particle showing in her mouth. Mr. Herrick's observation that the parent ate the dejected pellicle was new and interesting to me; for, on the contrary, I have seen the Cardinal and others assiduously wipe the beak on a twig, as if the performance had been disagreeable; but then this occurs after food is taken, as well. I have noticed that the little Social Sparrows (Hair-bird) may have one place of deposit for the pellicles. For one brood they used the dead limbs of a plum tree exclusively, and none was ever dropped on the way.

There is a large field here for further observation. Let us hope for more of this, and for something further on this special topic.—JAMES NEWTON BASKETT, *Mexico, Mo.*

RECENT LITERATURE.

Rothschild and Hartert's 'Review of the Ornithology of the Galapagos Islands.'¹—The Galapagós Islands have come to be ornithologically classic ground in consequence of the numerous special papers that have appeared upon the birds of this exceedingly interesting archipelago. In

¹ A Review of the Ornithology of the Galapagos Islands. With Notes on the Webster-Harris Expedition. By Hon. Walter Rothschild, Ph.D., and Ernst Hartert. *Novitates Zoologicae*, Vol. VI, pp. 85-205, pll. v and vi, August, 1899.

1837 John Gould published a paper on the Ground Finches collected there by Darwin on his famous voyage; in 1870 Sclater and Salvin published a paper on Dr. Habel's collection of Galapagos birds, followed in 1876 by Salvin's special memoir 'On the Avifauna of the Galapagos Archipelago'; in 1871 Mr. Ridgway published the final results of his work on the Baur and Adams collection; and we have in the present memoir a report on the Webster-Harris collection, made in 1897.

The Webster-Harris expedition was suggested to Mr. Frank B. Webster of Hyde Park, Mass., by Mr. Rothschild "towards the end of 1896," and the expedition set out in March, 1897, "under the command of Mr. Charles Miller Harris as chief naturalist and Mr. S. A. Robinson as sailing master, Messrs. James Cornell, O. E. Bullock, and George Nelson as collectors." The party went to Colon with the intention of there chartering a suitable vessel for the cruise. While there Robinson, Cornell, and Bullock "contracted yellow fever and died, partly at Colon, and partly on their voyage" to San Francisco, where Nelson gave up the trip and returned home. Here Mr. Harris, after some delay, chartered the two-masted schooner 'Lila and Mattie,' and secured Messrs. R. H. Beck, F. P. Drowne, and C. D. Hull as collectors. The original plan of making extensive collections at Guadalupe Island in the Revillagigedo Group, and at Cocos Island had to be abandoned, owing to the unfortunate delay in starting, only a short stay being made at Clarion Island, on the way to the Galapagos. The party left San Francisco June 21, 1897, sighting Clarion Island July 2, where a couple of days were spent collecting; leaving Clarion Island July 4, the party reached Culpepper Island, Galapagos, July 26, where work was carried on continuously till Dec. 28, the islands of practically the whole group being visited, and San Francisco was reached, on the return trip, Feb. 8, 1898.

The diaries of Messrs. Harris and Drowne are printed (pp. 86-135) as introductory to the main paper, and contain much interesting information respecting the experiences of the party and their work, as well as important information on the character of the islands visited and their natural products. Then follows 'General Remarks about the Fauna of the Galapagos Islands' (pp. 136-142). The material available for investigation by the authors numbered "not less than 3075 skins from the expedition under Mr. Harris, and the Baur collection of about 1100 skins," besides access to Gould's and Salvin's types in the British Museum. The Baur collection, now principally in the Tring Museum, contains also Mr. Ridgway's types and topotypes of the species described by him from the Baur collection. "This material," say the authors, "is perhaps larger than any material ever brought together from any area of similarly small dimensions. Although we must admit that we are still sadly in want of biological observations upon many of the birds, and of all knowledge of the nidification and eggs of the land-birds, we can hardly believe that this vast material is 'still too fragmentary to warrant any serious attempt to

solve the problems to which Mr. Darwin first called attention.' If such collections are not sufficient to throw light upon these problems, no collections will ever do so; and we cannot see how the discovery of five or six more subspecies of land-birds, or of some more accidental visitors, can alter our present conclusions." These are: "I. The entire fauna of the Galapagos Islands [was] derived originally from America. II. It is uncertain whether there has ever been a land connection between the various islands and between the islands and the continent or not." In opposition, however, to Dr. Baur's theory that the islands were once connected with America and with each other, and were submerged in or after the Eocene period, it is stated that the geological evidence "is opposed to a former land connection with America"; and that Dr. Baur's supposition that the original number of species on this land-mass was small, and that as this mass of land became submerged, and the few original species which inhabited the whole area, having become restricted to the former mountaintops, now islands, became differentiated in many different forms through isolation, is less reasonable than the hypothesis that they reached their present homes at different times from the neighboring mainland.

Section V, 'The Birds of Galapagos Islands,' occupies pages 142-199, and includes 108 species and subspecies, of which 9 are given as of either doubtful validity or doubtful occurrence. Of the 65 land-birds all but 5 are forms peculiar to the islands, and there are also nine water-birds peculiar to the islands. The remaining 31 species (excluding the doubtful forms) are for the most part wide-ranging seabirds or North American migrants.

Fourteen new forms have been described from the Harris collection (mostly subspecies), of which six are described for the first time in the present memoir. The most noteworthy of these discoveries is the flightless Cormorant (*Phalacrocorax harrisi* Rothsch.) from Narborough Island, where it was found only in the surf, its wings being too small to enable it to fly.

Compared with Mr. Ridgway's 'Birds of the Galapagos Archipelago' (reviewed in this Journal, XIV, July, 1897, pp. 329, 330), there are numerous noteworthy differences, as with the 14 species added by Messrs. Rothschild and Hartert the total number recognized is only 108, as against 105 in Mr. Ridgway's list, while there are important differences in the nomenclature adopted. For example, Messrs. Rothschild and Hartert have for the first time used trinomials for the local forms of Passeres, explaining: "If trinomials are used everywhere else, there is no reason why the birds of the Galapagos Islands should be deprived of this most useful form of nomenclature. In cases where certain individuals of representative forms are hardly, if at all, distinguishable but where a series is easily separable, the recognition of subspecies is inevitable." It thus follows that in many cases where Mr. Ridgway used a binomial, the present authors use a trinomial. Rothschild and

Hartert also decline to recognize the genera *Cactornis* and *Camarhynchus* Gould, placing the whole group of thick-billed Finches, to the number of 35 forms, under *Geospiza*, notwithstanding the enormous difference between the two extremes of the series. (The extraordinary intergradation in the size and form of the bill is shown in Pl. vi of the memoir.) In consequence of the much larger amount of material available for examination, a number of Mr Ridgway's forms are synonymized with others, notably in the genus *Pyrocephalus*, where the number of species is reduced from six to two.

There is yet much to learn of the life histories of the birds of the Galapagos Islands, and probably some new forms to be discovered, but, as our authors claim, little new light is to be expected respecting the origin of the avifauna and its relation to that of other countries. That it is American in origin in respect to all its elements there seems no reason to doubt, and that in the evolution of its forms it presents no features not found, in more or less marked degree, in numerous other groups of islands. — J. A. A.

Salvadori and Festa on Birds of Ecuador.¹ The second and third parts of this report have now appeared, completing this valuable contribution to South American ornithology.² The first part included the Passeres oscines, the second part the Passeres clamatores, and the third and concluding part the Trochili and remaining groups. Part I contained 165 species, including 5 new to science and 10 new to Ecuador; Part II included 181 species, with 6 new to science and 7 new to Ecuador, and Part III, 266 species, of which 4 are described as new, and 34 are first recorded from Ecuador. The total number of species enumerated is 611, of which 17 were new to science and 51 new to Ecuador. The report includes much important technical matter, a record of the sex, date and place of capture of the specimens, and references to all the previous Ecuadorian records for each species, giving the localities from which they have been recorded.

Ecuador is considered to be divisible into four physiographical regions, namely, a Western, an Inter-Andean, an Eastern, and the Andean proper, each characterized by differences of altitude, temperature, humidity and vegetation. The birds especially characteristic of these several regions are briefly indicated.

As already noted, this carefully prepared report on Dr. Festa's large collection from Ecuador is not only an important contribution to South American ornithology but an especially valuable addition to our knowledge of the Ecuadorian ornith. — J. A. A.

¹ Viaggio del Dr. Eurico Festa nell' Ecuador. T. Salvadori ed. E. Festa. Ucelli. Part seconda, Passeres clamatores. Boll. Mus. Zool. ed Anat. Comp. d. R. Univ. di Torino, XV, No. 236, pp. 1-34, Nov. 1899. Parte terza, Trochili-Tinami. Ibid., No. 398, pp. 1-54. Feb. 19, 1900.

² For notice of Part I, see Auk, Jan. 1900, pp. 81, 82.

Oberholser on Birds from Central Asia.¹ — Dr. W. L. Abbott, formerly of Philadelphia, has earned an enviable reputation as a scientific and enthusiastic collector, who for a number of years past has devoted himself to natural history exploration, visiting successively parts of East Africa, the Seychelles, Madagascar, the Indian Archipelago, and southern and Central Asia in the prosecution of his work. The United States National Museum has been the recipient of his generous and extensive contributions of excellent material to various departments of zoölogy, but especially to mammalogy and ornithology, thus opening a new field of research to American naturalists, whose opportunities heretofore have largely been restricted to American material.

Mr. Oberholser's paper relates to a small collection of birds from Cashmere and Ladak, numbering 142 specimens and representing 62 species. *Totanus totanus curhinus* is described as new. *Saxicola montana* Gould (not Koch) is renamed *Saxicola oreophila*, and *Perisospiza* (nom. nov.) replaces *Pycnorhamphus* Hume, the latter being preoccupied. Several pages are given to a description of a series of 18 specimens of *Buteo ferox*, which seems to illustrate all the principal phases of plumage of this exceedingly variable species. The collector's notes from the fresh specimens, including measurements, are a valuable feature of the paper. — J. A. A.

Oberholser on a Collection of Birds from Madagascar.² — A small collection of birds made by the Rev. James Wills, chiefly near Imerina, in the east central part of the island, numbering 57 species, represented by 110 specimens, and purchased by the United States National Museum, forms the basis of the present paper. All are referred to previously described species, but the exact data respecting time and place of collection of the specimens, and Mr. Oberholser's critical annotations on many of them, and on various points of nomenclature, render the paper of much value. — J. A. A.

Oberholser on Birds from Santa Barbara Islands, California.³ — This is a list of the birds collected by Mr. Clark P. Streator under the auspices of the Biological Survey of the U. S. Department of Agriculture, April

¹ Notes on Birds collected by Doctor W. L. Abbott in Central Asia. By Harry C. Oberholser. Proc. U. S. Nat. Mus, Vol. XXII, No. 1195, pp. 205-228. April, 1900.

² Catalogue of Collection of Birds from Madagascar. By Harry C. Oberholser. Proc. U. S. Nat. Mus., Vol. XXII, No. 1197, pp. 235-248. April, 1900.

³ Notes on some Birds from Santa Barbara Islands, California. By Harry C. Oberholser. Proc. U. S. Nat. Mus., Vol. XXII, No. 1196, pp. 229-234. April, 1900.

9-29 and June 24-July 20, 1892. The new forms obtained by Mr. Streater had been already described. The list numbers 26 species, of which about one third are confined to this group of islands. The annotations are mainly technical.

Respecting *Sturnella magna neglecta*, which Mr. Oberholser would recognize "as a full species," he says: "It seems remarkable that any one who has ever heard the striking vocal performances of the western meadowlark should consider it a subspecies of the eastern bird."

If Mr. Oberholser should hear the Meadowlarks sing in certain parts of the Mississippi Valley, as eastern Iowa, Illinois, western Missouri, etc., or even in Florida, he would doubtless place less stress upon the value of the song character of the Western Meadowlark. — J. A. A.

Van Denburg's Notes on Birds of Santa Clara County, California.¹ — Mr. Van Denburg's observations were made mainly at two points in the western range of mountains that traverses Santa Clara County, namely, Los Gatos and Palo Alto, and are "based upon more or less casual observations extending over a period of fourteen years." The list relates only to the land birds, and for these "makes no pretence to completeness in any way." The list is nevertheless an important contribution to Californian ornithology, including 110 species with somewhat extended and very interesting field notes on many of them. — J. A. A.

Bonhote's List of the Birds of New Providence, Bahamas.² — The present paper is based on observations made by Mr. Bonhote during a year's residence on the island, and includes welcome notes on the manner of occurrence of the 59 species taken by him. A few others are referred to as seen but not positively identified. Four are recorded for the first time from the island of New Providence, namely, *Prothonotaria citrea*, *Oporornis agilis*, *Piranga rubra* (also mentioned in the introductory remarks as "*Piranga æstiva*"), and *Totanus solitarius*. — J. A. A.

Richmond on New Species of Birds. — Dr. Richmond has described a new species of *Dendroornis* from Alta Mira, Tamaulipas, Mexico, as *D. striatigularis*,³ and three new birds from the Province of Trong, Lower Siam, collected by Dr. W. L. Abbott⁴. These are *Æthopyga anomala*, *Criniger sordidus*, and *Turdinulus granti*. — J. A. A.

¹ Notes on some Birds of Santa Clara County, California. By John Van Denberg. Proc. Amer. Philos. Soc., Vol. XXXVIII, 1899, pp. 157-180.

² List of Birds collected on the Island of New Providence, Bahamas. By J. Lewis Bonhote. Ibis, Oct. 1899, pp. 506-520. 7/

³ Proc. U. S. Nat. Mus. Vol. XXII, No. 1200, pp. 317, 318.

⁴ Descriptions of Three New Birds from Lower Siam. By Charles W. Richmond, Proc. U. S. Nat. Mus. Vol. XXII, No. 1201, pp. 319-321.

Bangs on a New Quail-Dove from Colombia.¹— Mr. Bangs finds that the *Geotrygon* from the Santa Marta region of Colombia, at first referred to *G. linearis*, is subspecifically separable, and he has given to it the name *Geotrygon linearis infusca*. —J. A. A.

Dugmore's 'Bird-Homes'.² — Mr. Dugmore here enters a comparatively new field, at least for America. While many half-tone illustrations of birds' nests and young birds have been published of late in ornithological journals and elsewhere, Mr. Dugmore is the first to give us a distinctively illustrated treatise on 'Bird-Homes.' As shown by the title page, the work is limited to the 'Land Birds Breeding in the Eastern United States'; but of course not all the species are illustrated. Of the forty full-page plates, fourteen are in colors, four of these being plates of eggs. The plain half-tones are excellent, and the subjects are well chosen. The colored half-tones, by the three-plate process, are as a rule far from satisfactory, though a few of them are rather attractive, and to some tastes may be very pleasing. Their fault is in the method of reproduction, the results being surprisingly good considering the low cost.

'Bird-Homes' consists of two parts, Part I (pp. 1-33) being general and introductory, and Part II (pp. 35-183) systematic. The species are grouped into categories, under nine chapter headings, according to whether the species builds an open, a covered or an arched nest, on the ground, in open country or in woods, in bushes, trees, or vines, or in holes, and if in holes, whether in trees, walls, banks, etc. The nests of about forty species are illustrated, selected to represent all these various methods of nesting. The species thus succeed each other without reference to their systematic relationships, the chapter grouping, according to character and position of the nests, being intended to aid in the identification of the species. A brief description is given of the nest and eggs of each species, with a statement of its breeding range, followed by a short account of its nesting habits.

The geographical area covered by 'Bird-Homes' is so extended that many of the species are necessarily treated at second hand. We are not sure that the author would not have produced a more valuable book if he had restricted its scope to his own personal observations, and given these

¹A New Dove from the Sierra Nevada de Santa Marta, Colombia. By Outram Bangs. Proc. New Engl. Zool Club, I. pp. 107-109, May 14, 1900.

² Bird Homes. | The Nests | Eggs and Breeding Habits of | the Land Birds Breeding in the | Eastern United States; with | Hints on the Rearing and Pho- | tographing of young Birds | By | A. Radclyffe Dugmore | — | Illustrated with Photographs from Nature by the Author | — [Vignette] New York | Doubleday & McClure Co. | 1900 — 8vo, pp. i-xvi, 1-183, 40 fulpage plates (14 colored), and 10 text illustrations. Price, \$2.00 net.

in greater fullness, so as to make the work strictly an original contribution to the life history of such species as he had had opportunity to study personally in the field.

Pearson's 'Beyond Petsora Eastward.'¹—While the principal scientific results of the voyages here detailed have previously been published, in 'The Ibis,' 'The Journal of Botany,' and the 'Quarterly Journal of Geology,' 'Beyond Petsora Eastward' will be welcomed by both the general reader and the naturalist as a most interesting contribution to the history of Arctic exploration. Mr. Pearson was accompanied by Colonel Feilden, so well known for his important contributions to the natural history of various portions of the high North, and on the first voyage by the Rev. H. H. Slater, an ornithologist and botanist of large experience, his place being taken on the second voyage by Mr. Frederick Curtis, a student of Guy's Hospital. While the book is written by Mr. Pearson, he acknowledges his indebtedness to Colonel Feilden for the use of his diaries in the preparation of the work. The narrative takes the diary form, which greatly increases its interest for the general reader. Mr. Pearson in speaking of the work in his preface says: "It may be complained that the whole thing is far too 'birdy,' and without doubt birds and their doings occupy the largest portion; but the study of bird-life was the first reason and object of the voyages. Birds also are my excuse for adopting the form of a strict diary; for one of the chief interests connected with the study of their habits during the breeding season is the date at which they complete the various stages from nidification to the appearance of the young birds in full plumage on the wing."

We have here outlined the objects of the expeditions and the method of presentation of the results. It need only be said that every page is full of interest, and especially is the narrative replete with information for the ornithologist. Nearly one fourth of the 88 half tone plates relate to birds, giving excellent representations of the nests and breeding haunts of various Arctic breeding birds, few of which have been previously illustrated. Among them are nests and eggs of the Dotterel, Red-throated Pipit, Rough-legged Buzzard (including young of various ages), Little Stint, Shore Lark, Snow Owl, Red-throated Diver, Brünnich's Guillemot, Red-necked Phalarope, and other species. There is also a colored plate of the eggs of the Little Stint (*Tringa minuta*), showing three sets varying greatly in color.

¹ "Beyond Petsora | Eastward" | Two Summer Voyages to | Novaya Zemlya | and the Islands of Barents Sea | By | Henry J. Pearson | With Appendices | on the Botany and Geology | by | Colonel H. W. Feilden | London | R. H. Porter | 7 Princes Street, Cavendish Square, W | 1899.—Royal 8vo, pp. i-xiv+1-335, with 1 colored and 88 half-tone plates, and 8 maps and plans. Price, 22s. 6d., nett.

The voyages here described were made in 1895 and 1897. In 1895 considerable time (June 20-27) was spent on the Murman coast of Russian Lapland, and (July 5-15) on Kolguer Island; Novaya Zemlya was reached July 17, and ten days later the party started on their homeward trip, reaching Bergen, Norway, August 9. The expedition largely failed of its original purpose, owing to the condition of the ice and the unsuitableness of the vessel. The purpose of the second expedition was to explore the tundra-land between the Petchora River and the Ural Mountains. Owing to unfavorable weather and ice conditions this country was never reached, and the "Great Tundra, . . . lying between the Petchora and Karataikha rivers, yet remains an unknown land, as far as its bird-life during the summer season is concerned." The voyage occupied eleven weeks, and the time was occupied in "interesting work on Waïgatch, Dolgoi Island, and Novaya Zemlya."

The narrative of the two voyages occupies pp. 1-168, and is followed by appendixes on the botany and geology, by Colonel Feilden, of the regions visited, and on the ornithology by Mr. Pearson. Thus 'Appendix G, Ornithology,' contains a summary of the observations on the birds, giving briefly the principal facts, while reference to the index will give a clue to the fuller details. The list altogether numbers 67 species, while tabular lists indicate the species met with at the different points visited; namely, Waïgatch, with 38 species; South Island of Novaya Zemlya, 44 species; North Island of Novaya Zemlya, 32 species; Dolgor Island, 20 species, and Habarova, 25 species.

Of the sixteen species of passerine birds met with, the greater part were seen only in Russian Lapland, the birds found at the other points being the usual Arctic shore birds and water fowl, with a few species of raptorial birds. The colony of Brünnich's Murres found at Nameless Bay, Novaya Zemlya, was not only the largest met with, but "ranks as one of the most important in the Arctic regions." It is illustrated in plates 73 and 74 and described at length on pages 162 and 163. The higher parts of the same cliffs were occupied also by the Glaucous Gull in great numbers, — "handsome, well-fed birds, who looked as if they had not a care in life beyond the selection of the youngsters [young Murres] from the ledges below."

The book is well gotten up, and profusely illustrated with excellent halftone plates, showing the scenic, geological, and floral features of the coasts and islands visited, with many pictures of Lapps and Samoyedes, etc., as well as the many views illustrating bird life. — J. A. A.

Collett and Nansen's Birds of the Norwegian North Polar Expedition.¹

¹ The Norwegian North Polar Expedition, 1893-1896. Scientific Results. Edited by Fridtjof Nansen, IV. An Account of the Birds. By Robert Collett

—This sumptuously printed brochure of fifty-four quarto pages and a colored plate is compiled by Dr. Collett from the journals and verbal information supplied by Nansen, Sverdrup, and other members of the 'Fram' expedition, and is arranged in four sections. Section 'I, Siberian Coast (autumn, 1893),' (pp. 6-13) contains a list of 25 species, of which the Snowflake (*Plectrophenax nivalis*), observed all along the Siberian coast where a landing was made, is the only passerine bird here met with, and it was seen, as a rule, only singly or a few together. A Falcon (*Falco æsalon*), a Hawk (doubtfully identified as *Archibuteo lagopus*), the Snowy Owl, and a Ptarmigan (*Lagopus lagopus*) were the only other land birds seen, and of these the Owl was the only species numerously represented. The Black-bellied Plover, the Purple Sandpiper and two species of Phalarope (*Phalaropus hyperboreus* and *Crymophilus fulicarius*) comprise the shore birds positively identified. Two species of Geese, the Old Squaw and Eider Duck, the Arctic Tern, the Kittiwake, several species of Gulls (*Larus*), two species of Jaeger, a Loon, and two species of Guillemot make up the list of sea birds, very few of which were seen in any considerable numbers.

Section 'II. The First Summer (1894) in the Ice,' (pp. 14-23) numbers only 9 species, two of which are not certainly identified. The only land bird is the Snowflake, a single individual of which visited the 'Fram' on June 21, 1894, in 81° 49' N. Lat.; there are no shore birds, and the sea birds are all Gulls, Jaegers, Fulmars and Guillemots. Interest here centers in the Ross's Gull (*Rodostethia rosea*), met with August 3-8, in N. Lat. 81° 5' to 81° 8', when eight specimens were shot, all young birds of the year, just old enough to fly. These apparently comprise all that were seen, as the birds shot on the 8th were probably those seen on the 6th. These specimens are of special interest as being the youngest yet taken; they are described in detail and illustrated in two plates (one colored).

Section 'III. The Sledge-journey and Franz Josef Land (1895-1896).' This list (pp. 24-43) contains 15 species, the Snowflake being again the only land bird; it was met with only on Franz Josef Land and the neighboring islands. This section contains very interesting notes on the habits of the Kittiwake, the Glaucous Gull, the Ivory Gull, the Parasitic Jaeger, the Fulmar, the Dovekie, etc., and further very important information respecting the Roseate Gull, which was seen in considerable numbers to the northeast of Franz Josef Land, between July 11 and August 14, including both adult birds and young. "They were not shot, as they were too small to serve as food." No suitable breeding

and Fridtjof Nansen. Published by the Fridtjof Nansen Fund for the Advancement of Science. Christiania: Jacob Dybwad; London, New York, Bombay: Longmans, Green and Co.; Leipzig: F. A. Brockhans, 1899. 4to, pp. 1-54. 1 plain and 1 colored plate.

place for this species was discovered, although a strip of low bare ground seen on Liv Island may possibly afford it a suitable nesting place. "The last specimens were seen near the Coburg Islands between the 11th and 14th of August. After that they vanished completely, and no specimen was seen during the rest of the journey; and there was thus no sign of their inhabiting any locality in the region between Dickson Sound and Cape Flora."

Section IV is entitled 'The Last Two Summers in the Ice. Northeast of Franz Josef Land, 1895, north of Spitsbergen, 1896.' In this list (pp. 44-53) 19 species are enumerated, several being here for the first time noted, as *Egialitis hiaticula*, *Xema sabini*, *Fratercula arctica glacialis*, etc. The Snowflake again figures as the only land bird, and Ross's Gull is again met with, having been observed on July 18, 19, and 22 and August 4, 9, and 11, — in all seven specimens being seen, in N. Lat. $84^{\circ} 27'$ to $84^{\circ} 46'$, and all were apparently old birds.

The whole number of species recorded in the four lists is 33, of which some were seen only once or twice, and a few are not positively identified. Five only are recorded in all of the four lists, these being the Snowflake, the Kittiwake, the Glaucous and Ivory Gulls, and Mandt's Guillemot. Respecting many of the species a great deal of very interesting information is recorded, and besides this the memoir is a most important contribution to the ornithology of the high North. The two plates for the first time illustrate the first plumage of the little known Ross's Gull. — J. A. A.

Stone on the McIlhenny Collection.¹ — This is a technical report on the fine collection of 1408 birds of 69 species, secured by Mr. E. A. McIlhenny at Point Barrow, Alaska, from August, 1897, to August, 1898, the publication of Mr. McIlhenny's field-notes being deferred.

Mr. Stone states "The material obtained is the finest yet brought from the Arctic regions, and the series are so full that the molt and variations of plumage in many of the birds, that have not previously been understood are beautifully illustrated." It is therefore fortunate that this valuable collection has been studied by an ornithologist so well fitted for the task as Mr. Stone. Only one form, *Asio accipitrinus mcilhennyi*, proved to be separable but of almost all the others detailed descriptions of changing plumages and extended critical comments on the manner of molting are given, the remarks concerning the Eiders being of special interest and value. Six species observed by Murdoch at Point Barrow were not obtained, and thirteen species were added to Mr. Murdoch's list. — F. M. C.

¹ Report on the Birds and Mammals obtained by the McIlhenny Expedition to Pt. Barrow, Alaska. By Witmer Stone. Proc. Acad. Nat. Sci. Phila., 1900, pp. 4-49 (birds, pp. 4-33). March 24, 1900.

Jones on Warblers' Songs.¹ — Nearly six years ago Mr. Jones requested the members of the Wilson Ornithological Chapter of the Agassiz Association to begin a critical study of the songs of Warblers, and the results of their observations in connection with his own notes, covering a period of fifteen years, and all available published material on the songs of these birds are brought together in this useful and suggestive paper.

Before proceeding to a detailed treatment of the song of each species Mr. Jones discusses the development of the Warblers' song-type, the diurnal and seasonal song periods, the kinds of song, and variability in song. Many Warblers possess two kinds of song, which Mr. Jones designates as Call Songs and Passion Songs. The former is the 'every day' song of the species, which we are glad to see Mr. Jones does not consider as addressed especially to the female, but as an announcement of the bird's presence, a challenge, or reply to a rival, and, to our mind, chiefly as an irrepressible expression of the intense physiological vigor of the season, when it becomes the "passion song," which in response to extreme emotion carries the singer off its feet into the air "on quivering wings to pour out its melody without pause until the inspiration has passed."

With others who have attempted to describe birds' songs, Mr. Jones appreciates the difficulty of their adequate presentation. With most Warblers, especially the Dendroicas, this is particularly true. Musical annotation is of little service; and syllabification can, at the best, give but a vague idea of the original. However, careful descriptions may help us to identify the song, after we have heard it, and Mr. Jones's paper is therefore of value to field students, who uniformly find Warblers the most difficult of our land-birds to identify.

A 'Field Key to the Spring Male' Warblers of North America concludes this excellent piece of work. — F. M. C.

Proceedings of the Nebraska Ornithologists' Union.² The Nebraska Ornithologists' Union was organized at Lincoln, Nebr., on Dec. 16, 1899, with the following officers: Prof. Lawrence Bruner, President; I. S. Frostler, Vice-President, Dr. R. H. Wolcott, Recording Secretary; W. D. Hunter, Corresponding Secretary. The papers read at the first meeting are now presented in an octavo pamphlet of some forty pages and include the President's address, 'Ornithology in Nebraska,' in which

¹ The Songs of Warblers (Mniotiltidae). By Lynde Jones, M.S., Instructor in Zoölogy, Laboratory Bulletin No. 10, Oberlin College, Oberlin, Ohio, March 20, 1900. Also issued as Wilson Bulletin No. 30. 8vo, pp. 56.

² Proceedings of the Nebraska Ornithologists' Union at its First Annual meeting, Lincoln, Nebr., Dec. 6, 1899. Edited by Robt. H. Wolcott. 8vo, pp. 44, 1 pl.

the characteristics of the avifauna of the State are pointed and the educational value of bird study in the schools commented on; 'A Twenty-three years' Record kept by Dr. A. L. Child of Plattsmouth, Neb.,' by Dr. R. H. Wolcott; 'Additional Notes and Observations on the Birds of Northern Nebraska,' by Rev. J. M. Bates, notes on 62 species; 'The Bird Fauna of the Salt Basin, near Lincoln,' by J. S. Hunter, with notes on 89 species; 'Some Bird Notes from the Upper Elkhorn,' by Merritt Cary, notes on 208 species; 'Some notes on the Nesting of the Raptures of Otoe County, Nebraska,' by M. A. Carriker, Jr., 'How to Popularize Ornithology,' by Wilson Tout, advocating the study of birds in schools; 'A Plea for the English Sparrow,' by Lawrence Skaw, a native of Denmark who, believing the English Sparrow to be harmless in his native land considers it desirable here; and 'Suggestions as to an accurate and uniform Method of Recording Observations,' by Dr. R. H. Wolcott, recommending a more exact use of terms in describing a bird's relative numbers.

The formation of State Ornithological Clubs is always a matter for congratulation and the first publication of the Nebraska Ornithologists' Union, assures us that this new association will exert a widespread influence in increasing our knowledge of Nebraska birds and in arousing an interest in ornithology in that State. — F. M. C.

Chapman's 'Bird Studies with a Camera.'¹ — In this neat volume the author embodies the results of several years' hard and painstaking labor in a comparatively new field — that of photographing birds in a state of nature. In his introductory remarks the author says: "Bird photography, as I would encourage it, does not mean simply photographing birds; it means the use of the camera as an aid in depicting the life histories of birds." With that end in view, Mr. Chapman has presented us with an attractive and pleasing work which cannot fail to be of the utmost interest to the bird student, because of the great number of ornithological facts recorded therein by the camera.

Chapter I which treats of the bird photographer's outfit, takes up the subject of the camera, lens, shutter, etc. The practical tests which the author has given most of the apparatus now on the market, with the additional advantage of being in a position to compare notes with a wide circle of professional and amateur photographers, and thus reap the benefit of their experience, enables him to speak authoritatively on these

¹ Bird Studies | with a Camera | With Introductory Chapters | on the Outfit and Methods | of the Bird Photographer | By Frank M. Chapman | Assistant Curator of Vertebrate Zoölogy | in the American Museum of Natural History, and Author of Handbook of Birds | of Eastern North America, Bird-Life, etc. | With over one hundred photographs | from Nature by the Author | New York | D. Appleton and Company | 1900 — 12mo, pp. xvi + 218. \$1.75.

points. Chapter II describes the methods of the bird photographer. The suggestions given here are offered as hints to the bird photographer, and serve to show what an endless amount of patience and ingenuity are necessary to secure good results.

Hitherto much has been accomplished in the direction of photographing nests and eggs, and in some cases the young birds, but the author of the present volume is the pioneer in this country to attempt making a collection of actual photographs of adult birds with the object of contributing toward their biography. A knowledge of the bird's habits is necessary to successful bird photography, and many details of the daily life of the subject must necessarily be forced upon the student who attempts to portray them. Bird photography, as practised by the author of the present volume, therefore becomes a most instructive teacher of the ornithologist; and many facts will be recorded while engaged in its pursuit, the existence of which might otherwise have escaped notice.

The remaining chapters are devoted to life histories of the species treated. Mr. Chapman's field experiences are charmingly written, and the reader cannot fail to express a desire from time to time that he might have been permitted to actually witness the scenes related.

The numerous magnificent half-tones with which these pages are illustrated — showing in some instances different stages of growth from the downy young to the adult birds — have never been surpassed. Many of these pictures, while they give evidence of the greatest photographic skill, are especially noteworthy because of their scientific interest.

How invaluable would be a series of good photographs of the Great Auk, clustered as they once were in all their abundance on Funk Island? Or one of the immense flocks of Wild Pigeons passing across the sky as in years past. In place of these we must be content with humble description. But through the medium of the present volume, the species treated — the great masses of cliff-nesting water-birds on the Bird Rocks in the Gulf of St. Lawrence, and the armies of Brown Pelicans on their native strand in their Florida home — will be seen by future generations of bird-lovers as they exist at the present time.

Aside from its popular interest to those who wish to get near to nature, this volume cannot be too highly commended for its scientific value; and the photographs of the bird colonies as here depicted, will forever remain monuments to Mr. Chapman's skill as a photographer and as an indefatigable ornithologist.— J. R.

Farr's Check List of New York Birds.¹— This List was originally prepared by Dr. Farr for use in collecting data for a 'Bulletin' on the birds

¹ Check List of New York Birds. By Marcus S. Farr, D. Sc. Bulletin of the New York State Museum, No. 35, Vol. VII. Albany: University of the State of New York, 1900. 8vo, pp. 193-409. Price, 25 cents.

of New York, a work now well under way and likely to prove a very important publication. It is Dr. Farr's intention "to include all the birds known to occur or to have occurred in our State, and only those forms have been admitted that have actually been taken in New York." As thus limited the list includes 380 indigenous and 4 introduced species, and is followed by a 'Hypothetical List' of 17 species which are likely to occur from their having been taken in adjoining States. The list has been made up with great care and discretion, and shows that the author has his work thoroughly in hand. It is printed on only one side of the paper, leaving the opposite page and wide spaces between the species for annotations, which will prove a great convenience to those wishing to add their own annotations. Dr. Farr states that any corrections or additions to the list will be gratefully received. In the present list the annotations are limited to the rare or accidental species, and consist of footnotes citing the place of record for their occurrence. — J. A. A.

Palmer on Legislation for the Protection of Birds.¹—This is a very important and timely publication in the interest of bird protection. It serves to show how imperfect and crude most legislation has hitherto been, and clearly points out the necessity for a more uniform and more efficient system of bird laws for the different States and Territories of the United States and the Canadian Provinces. As Dr. Palmer says, "the protection of birds is a national, not a local, question. It deals largely with migratory species which breed in one section, winter in another, and traverse several States in passing to and from their breeding grounds." While absolute uniformity may be unattainable, it "seems to be feasible to secure a much greater degree of uniformity than at present exists." Dr. Palmer has done much to pave the way for this by exposing the defects of present laws on the subject and pointing out how they may be immensely improved. Notwithstanding the increased interest shown of late years in the subject, and the growing sentiment in favor of bird protection, both from economic and æsthetic considerations, still, as Dr. Palmer says, "bird destruction is going on rapidly in the United States, and in many regions there is a marked decrease in the abundance of certain species. Cheap guns, lax laws, the mania for collecting and shooting, and more especially the enormous demand for birds for market and for the millinery trade, are responsible for this reduction in bird life."

Dr. Palmer's brochure is divided into three parts. Part I is entitled

¹ Legislation for the Protection of Birds other than Game Birds. By T. S. Palmer, Assistant Chief, Biological Survey. Prepared under the direction of Dr. C. Hart Merriam, Chief of Biological Survey. Bulletin No. 12, U. S. Department of Agriculture, Division of Biological Survey. Washington, Government Printing Office, 1900. 8vo. pp. 94, 2 pll. and 8 text figures.

'General Discussion of Protective Legislation,' under which is given: 'History of Protective Legislation'; 'Definitions of Game Birds'; 'Species erroneously considered Game Birds,' as Pigeons and Doves, Flickers, Bobolinks or Reedbirds, Meadowlarks, Blackbirds, and Robins; 'Insectivorous and Song Birds,' as defined in various legislative acts, etc.; 'Plume Birds,' and 'Birds of Prey,' to what extent protected in various States, etc. Then follows a 'List of species protected in each State and in the Canadian Provinces, with penalties for killing the birds and destroying nests and eggs.' Also an enumeration of the birds "specifically exempted from protection" in the different States and Canadian Provinces. Dr. Palmer considers, very properly, that "the rights of ornithologists and bird students should be recognized as well as those of sportsmen," and gives, in tabular form, the requirements of the various States regarding regulations and permits for collecting birds, nests, and eggs for scientific purposes. There is also comment on licenses and other regulations regarding shooting, which relate more especially to game birds, but have a bearing on bird protection in general; on 'Birds in Captivity,' and the prohibition of trapping, netting and shooting. Part I concludes with some account of the different methods and provisions for the 'Enforcement of Protective Laws,' and of the 'Necessity for further State Legislation,' with a review of recent 'Federal Legislation,' as the Hoar Bill, the Teller Bill, and the Lacey Bill. Each of these bills is given in full, with explanatory comment, giving the legislative history of each and stating its scope. Only one of these bills, the Lacey Bill, has become a law.

Part II, 'State Laws for the Protection of Birds,' gives a digest of all State legislation for the protection of birds, as far as this is at present in force. As Dr. Palmer's subject relates only to non-game birds, only those portions of the laws "relating to birds generally, as distinguished from game birds, have been quoted verbatim." Part III relates in a similar manner to 'Canadian Laws for the Protection of Birds.'

Dr. Palmer has here given us in a brief form the results of a vast amount of careful and laborious research and has laid an excellent foundation for future intelligent work, in the line of improved legislation in the interest of bird protection; and we trust that his admirable paper will not only prove a guide, but an incentive, to this end. — J. A. A.

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CORRESPONDENCE.

Formaldehyde as an Aid in Collecting Ornithological Specimens.

TO THE EDITORS OF 'THE AUK':—

Dear Sirs:—At various times during my collecting experiences I have made experiments for the purpose of finding some preservative that would temporarily check decay in an ornithological specimen without having any injurious effect upon the skin of the bird or upon the hands of the operator while preparing the skin for his collection. Various compounds and combinations of arsenic, borax, carbolic acid, corrosive sublimate, etc., had been tried with but partial success and with more or less damage to the operator, the usual result having been some bad sores in any slight cuts or around the finger nails. Formic aldehyd gas (HCOH) had attracted my attention in the journals of the day in connection with its disinfecting and insecticidal properties, but I had not seen any commercial solution of it, and did not know where to find such an article.

In August, 1897, while collecting sea birds on Monterey Bay, California, specimens accumulated more rapidly than it was possible to handle them in that rather warm, damp climate, as had often happened on previous occasions. During this visit I became slightly acquainted with a student from Stanford University who was collecting Zoöphytes, etc., from the bay and discovered that he was using a weak aqueous solution of formic aldehyd to preserve his specimens, and also that this could be purchased under the proprietary name of 'Formalin' with a strength of 40 %.

After my return to San Francisco inquiry developed the fact that this solution could be procured at a much lower rate under the trade name of 'Formaldehyde,' which at present writing is sold at 55 cents per pound bottle,—larger quantities being proportionately less.

While examining this collection of Zoöphytes the idea occurred to me of trying the effect of some of this solution upon my birds, as business demanded my presence elsewhere in a day or two and I was anxious to save all the specimens on hand. As the formaldehyde seemed to preserve the starfish and other more delicate forms with only a comparatively slight shrinkage it was reasonable to presume that a small amount injected into the abdomen of a bird would temporarily arrest decomposition of the viscera, and that probably the gas evaporating from the solution would permeate the flesh to a sufficient extent to preserve the bird for two or three days at least.

My new acquaintance kindly supplied me with a little of his solution for experimental purposes. A small glass syringe was procured, a couple

of teaspoonfuls were injected into the viscera of the birds to be experimented upon and, as the stomachs were full of fish, about half a teaspoonful was sent down the gullet, the throat being then plugged with cotton. Also on the afternoon before leaving I pulled the skins off some *Puffinus creatopus* and *P. griseus* that were still left, put some cotton dampened with the solution inside the skins, after they were turned back into natural shape again, and rolled them up in newspaper to be carried in a valise. Two days afterward both the birds in the flesh and the treated skins were found to be in good condition. The former were skinned and put up three days after having been shot, while the latter were scraped and finished as time permitted, the last ones having been five days in this condition. These were kept in a tight box containing a layer of damp sand upon the bottom and except for a slight hardening of the tissues were in sufficiently good shape to make a very fair skin.

These results exceeded my expectations, and further experiments demonstrated the fact that the use of formaldehyde places the collector in a comparatively independent position in regard to the number of specimens he may collect in a day, as with its aid he can keep a number in good condition until time admits of preparing them for his collection.

I came across an old-fashioned veterinary hypodermic syringe at a low figure, and this, with a bottle of saturated solution of formaldehyde accompanies me on all my expeditions. This syringe holds one teaspoonful, and this is sufficient for a bird as large as a Partridge. The sharp needle is punched into the abdomen in one or more places, a few drops are sent down the throat of a bird to be saved, and if to be kept for some days a little is injected into the brain by opening the bill and forcing the needle upwards and backwards between the eyeballs.

In place of a regular hypodermic, a common glass syringe, or even an eye dropper, can be made to answer, especially if the end is heated and drawn out to a sharp point as in an egg-blower.

The amount injected and the strength of the solution must depend upon the size of the bird. Formaldehyde comes in saturated solution of nominally 40%, while from 4% to 10% is what may ordinarily be used. For birds up to the size of a Partridge, 4% is sufficiently strong, from this to the size of a Duck 8 or 10%, and for Geese and very large birds a comparatively smaller amount of the full strength seems more satisfactory than a larger amount of a weaker solution. It is well to avoid, as far as possible, having one's hands come in contact with the strong solution as this is apt to harden the skin of the fingers and cause cracks into which arsenic may be introduced. Upon the basis of the original solution being 40% it is a simple matter to approximate any desired strength by mixing in a separate bottle one part of the solution to so many parts of water roughly estimated.

The strength and amount necessary for different birds will soon be learned with a little practice. If too much or too great a strength is used upon small birds the body becomes more or less hardened and dry, mak-

ing it exceedingly difficult to skin the specimen. Care must also be taken to avoid using more than is absolutely necessary in the throat, as the thinness of the gullet allows the formaldehyde to act directly upon the skin of the neck, which is apt to become so stiff and dry as to cause it to tear in the effort to skin the bird over the head. A few drops only will suffice for the preservation of this part of the bird, except in the case of a large crop full of decomposing food. When properly treated with this solution, and properly cooled off in the first instance, birds will keep a week even in warm weather in sufficiently good condition to make a fair skin.

The saturated solution of formaldehyde is 40%, but it evaporates easily and is usually about 36%. As it is greatly adulterated, sometimes being nothing but pyroligneous or acetic acid mixed with impure methyl alcohol, and even when comparatively pure is much reduced in strength by unscrupulous dealers, it is much wiser to procure the article from an absolutely trustworthy source than to buy indiscriminately.

As a convenient insecticide and preventive of mildew formaldehyde fills a long felt want. When a burner for making the gas (formic aldehyde) is not within reach some of the solution can be poured into dishes and placed in the cases of specimens. It performs its work in a few hours. An occasional fumigation of a collection will prevent all danger from insects and also from mould in an ordinarily dry atmosphere. The gas evaporates like ammonia from the aqueous solution, penetrating every crevice and interstice, and destroys all insect life as well as fungoid growths. It is a wise plan to subject all specimens received in exchange or by purchase to a thorough disinfection, which is easily done in this manner.

Two and a half years' use of formaldehyde has so demonstrated its effectiveness and convenience in the preparation of specimens that all ornithological collectors should become acquainted with its properties. It will be found of the greatest assistance in the field and in the laboratory.

JOSEPH MAILLIARD.

San Geronimo, Cal.

NOTES AND NEWS.

PROF. ALPHONSE MILNE-EDWARDS, an Honorary Member of the American Ornithologists' Union, died in Paris April 21, 1900, at the age of sixty-four years. Prof. Milne-Edwards was of English descent; his grandfather, Bryan Edwards, M. P., was a West Indian planter, who settled at Bruges, France. His father was the well-known eminent zoölogist of Paris, who died in 1885. The son, Alphonse, was associated many years with his father in zoölogical work.

Alphonse Milne-Edwards was born in Paris in 1835; he took his medical degree in 1859, and in 1865 became a professor in the School of Pharmacy. In 1876 he was made, as assistant to his father, Professor of Zoölogy at the Jardin des Plantes, and in 1891 was appointed Director of the Paris Museum d' Histoire Naturelle and of the Menagerie in the Jardin des Plantes, which positions he filled at the time of his death. He was long recognized as a leading authority in mammalogy and ornithology, and also achieved success in other lines of zoölogical research, in connection especially with deep-sea work. In 1881, assisted by a party of savants, he began, under the patronage of the French Government, a survey of the Gulf of Gascony, and later in the 'Travailleur,' and later still in the 'Talisman,' extended his work to the Canaries, the Cape Verde Islands, and the Azores. In recognition of the importance of these researches he was awarded the gold medal of the Royal Geographical Society.

His ornithological work is recorded in a long list of papers and memoirs, beginning as early as 1866, but his most notable contributions are his great work entitled 'Recherches Anatomiques et Paléontologiques pour servir à l'Histoire des Oiseaux Fossiles de la France,' published in parts, 1867-1872, consisting of four large quarto volumes, two of text and two of plates; and his 'Recherches sur la Faune ornithologique étienne des îles Mascareignes et de Madagascar,' 1866-1874. The first of these works made known for the first time the former existence in France of such tropical types as *Trogon*, the Secretary Bird, Parrots of the genus *Psittacus*, *Leptosomus*, and *Callocalia*. In many respects this was a remarkable work, and a most highly important contribution to ornithology. His material was limited generally to the 'long bones,' or the bones of the limbs, and the proper determination of these led to an exhaustive study of the comparative osteology and myology of living birds, the results of which are incorporated in his work. His important researches on mammals, particularly of Madagascar and Central Asia, including the discovery of new and strange forms, do not call for special mention in the present connection.

EDGAR LEOPOLD LAYARD, a Corresponding Member of the American Ornithologists' Union, died at Budleigh Salterton, Devon, England, on January 1, 1900, in his 76th year. We take the following notice of this well-known ornithologist from the April number of 'The Ibis' (p. 404): "Edgar Leopold Layard, C. M. G., . . . was elected an Honorary Member of the B. O. U. in 1860, and was therefore one of our oldest as well as one of our most valued correspondents. He was born at Florence on July 23rd, 1824, and entered the Civil Service of Ceylon when twenty-two years of age; but after nine years his health gave way, and in 1855 he accepted the invitation of the late Sir George Grey to a post in the Civil Service at Cape Town. There he founded the South African Museum, and became its first curator; after which he accompanied Sir G. Grey on a special mission to New Zealand, and subsequently became judge and

commissioner under the Slave Trade Treaties at the Cape. Transferred to the Consular Service, he was for some years at Pará, at the mouth of the Amazons; next he was sent to Fiji, where he arranged the cession, and was decorated in 1875; he then resumed Consular Service at Noumea, New Caledonia, and ultimately retired after forty-seven years of hard work. Layard was not a producer of books, and his chief work in this line was 'The Birds of South Africa,' published in 1867, of which a new and revised edition, with the collaboration of Dr. Bowdler Sharpe, made its appearance between 1875-84. It is rather by his many and varied contributions from 1854 almost to the time of his much regretted death that he will be remembered; and a column of closely-printed type in the General Subject Index to 'The Ibis' testifies to his energy in our special subject. Besides these, his bright and pleasant letters to 'The Field,' under his own name or the pseudonym of 'Bos Caffer,' will be familiar to most of our readers; and his genial personality will be greatly missed and regretted by all who have had the pleasure of his acquaintance."

PERCY S. SELOUS, an Associate Member of the American Ornithologists' Union, died at his home in Greenville, Mich., on April 7, 1900. His death was due to the bite of a pet Florida moccasin. Mr. Selous was a great traveller and an enthusiastic naturalist, especially interested in birds and reptiles. He was a member of the Michigan Ornithological Club, and an occasional contributor to various natural history journals, including 'The Auk.'

ALL PERSONS interested in fish and game protection and the protection of our birds, will be glad to learn that a course of lectures, together with field observations and demonstrations on this important subject now constitutes a regular part of the instruction in Cornell University. The course is offered to the junior and senior classes in the New York State College of Forestry, which was established two years ago as one of the colleges in Cornell University, with Dr. B. E. Fernow as Director.

The course is given by Dr. B. W. Evermann, ichthyologist of the U. S. Fish Commission, and consists of lectures, laboratory demonstrations and field observations on the life-histories of the important species of fresh-water food and game fishes, their artificial propagation and their protection; the relation of the forest to the streams and lakes and their inhabitants; the relation of the various forestry, logging, milling, mining and irrigation operations to the streams and lakes and to their inhabitants; and the value of the mammals and birds of the forest and how to protect them.

THE DEUTSCHEN ORNITHOLOGISCHEN GESELLSCHAFT will hold its annual meeting at Leipzig, Oct. 5-9, 1900. This is the fiftieth anniversary of the founding of the Society. In the celebration of this anniversary the American Ornithologists' Union is cordially invited to take part. The

program of the meeting indicates that it will be an important and very interesting congress, both scientifically and socially, and any members of the A. O. U. who may be able to attend will not only be cordially welcomed but will without doubt find it a very enjoyable occasion.

THE OUTLOOK for Bird Protection in North America has greatly improved during the last two or three years, which is no doubt due largely to the efforts of the Audubon Societies and the A. O. U. Committee on Bird Protection. A strong impression has been made upon public opinion and popular sentiment, now both strongly in favor of every reasonable measure for saving the birds. This popular sentiment is due to the educational efforts of the friends of the birds, who have been able to impress upon the public the importance of birds to agriculture, as well as their æsthetic interest.

The press has greatly aided the work, not only through the favorable attitude of the daily newspapers, far and wide, but especially through the agricultural journals, which are filled with articles showing that the wanton destruction of birds is working great injury to agricultural interests. The fashion journals have in many instances taken a strong stand against the destruction of birds for millinery purposes, and urge women to abandon the use of birds and birds' plumage for decorative purposes. One of the most pleasing evidences of the working of the leaven of reform in this field is the marked change of attitude on the part of that influential and excellent 'home journal,' 'Harper's Bazar,' which not so very long since was criticized in this magazine for its perverse attitude on the subject of aigrettes. In late numbers of this journal we have noted with pleasure its appeals to women in behalf of bird preservation, and especially its appeal to its women readers to help pass the Lacey bill, then long pending in Congress.

It is especially worthy of note that the two bills mentioned in the last issue of 'The Auk' (April, 1900, p. 200), the Lacey bill in Congress and the Hallock bill in the Legislature of New York, have both become laws, they forming the most important and advanced examples of legislation for the protection of birds thus far enacted. The strongest possible effort was made on the part of bird protectors to secure their enactment, and that they received on their final passage an overwhelming vote in their favor greatly strengthens hope for the future.

The widespread discussion in the public press of bird protection incident to the consideration of the two bills above cited, and especially of the Hoar bill, reintroduced into the Senate at the last session of Congress, but which failed of passage, has not only been the means of arousing public sentiment favorable to the cause, but has greatly alarmed the milliners respecting the effect of such legislation upon their business interest. Recognizing that the drift of public sentiment was thoroughly against the use of birds for millinery purposes, they have made overtures, through official action by the Millinery Merchants Protective Association to the Audubon Societies and the A. O. U. Committee on Bird Protection, pledg-

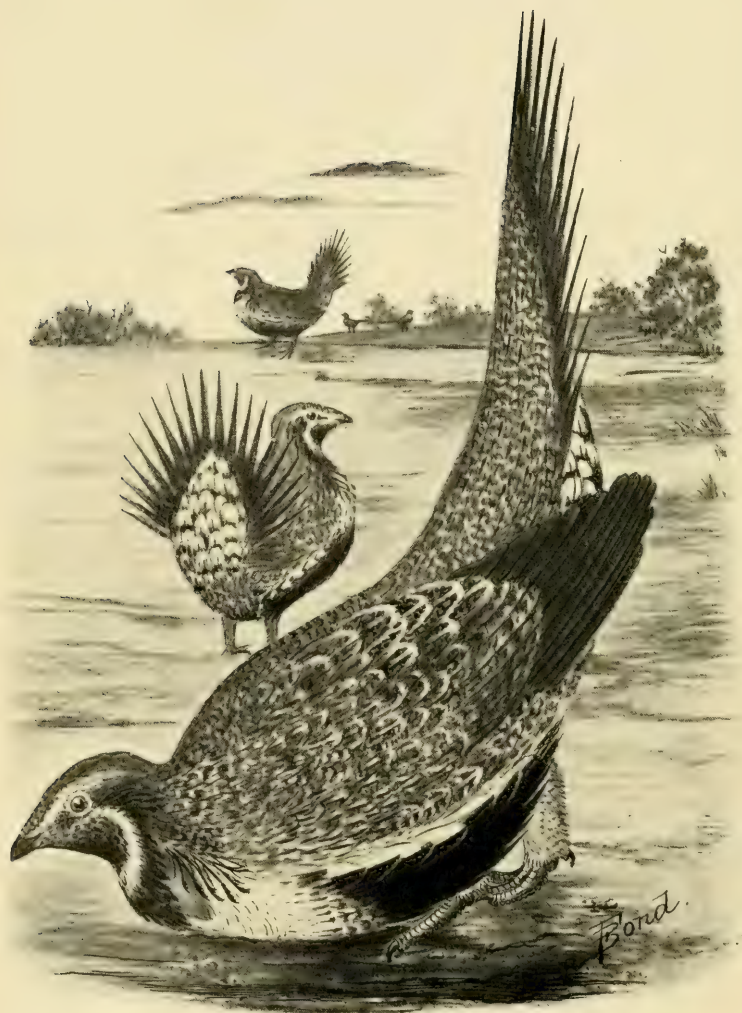
ing themselves "not to kill or buy any more North American birds from hunters or such people who make it a business to destroy North American birds," nor to sell North American birds or their plumage after their present stock has been disposed of, or in any case after January 1, 1902, in case the Audubon Societies and the American Ornithologists' Union will agree not to interfere with their use of the "plumage or skins of barnyard fowl, edible birds or game birds killed in their season," and of "the birds and plumage of foreign countries not of the species of North American birds. Furthermore, it shall be our solemn duty not to assist any dealer or person to dispose of any of their North American birds, if same have been killed after this date [April 21, 1900]. . . . In return for this pledge, we expect the Audubon Society and the Ornithological Union to pledge themselves to do all in their power to prevent laws being enacted in Congress, or in any of the States which shall interfere with the manufacture or selling of plumage or skins from barnyard fowl, edible birds and game birds killed in their season, and all birds which are not North American birds." This pledge is signed by a large number of the leading dealers in such supplies in New York and other cities.

This appeal is certainly entitled to respectful consideration, since, on the one hand, it guarantees on the part of a powerful association of dealers, that the killing of North American birds for millinery use shall at once cease, and that all traffic in them for such use shall also cease after a certain date, within which specified period the present stock is to be disposed of. There is of course no valid objection to the use of the plumage of barnyard fowls and of game birds killed in season for food; but doubtless many will see grave objection to the continued use of foreign birds. On the other hand, the ineffectual attempt already made to pass the Hoar bill, which is intended especially to prevent the importation of foreign birds for millinery purposes, and the belief on the part of those in position to know best about its future prospects that it cannot be enacted, renders the friends of this measure practically powerless, whatever action the Audubon Societies and the Ornithologists' Union might see fit to take in the matter. Of course no immediate concerted action can be taken by these organizations but it is a subject that may well be considered at a meeting of representatives of the Audubon Societies recently suggested in 'Bird Lore' (June 1900, p. 94) to be held in connection with the meeting of the A. O. U. in Cambridge next November.

ERRATA.—Through an unfortunate oversight in printing Plate V, illustrating Dr. Dwight's paper in the April number of 'The Auk,' the titles of the two figures were transposed. The title of the present Fig. 1 of Plate V should read Fig. 2. Neosoptile from *Colinus virginianus* ($\times 20$); and the title of Fig. 2, same plate, should read Fig. 1. Neosoptile from *Lagopus lagopus* ($\times 20$).

For Plate I on pages 153, 156, 157 and 161 read Plate IV.

Page 173, line 19, for *Picoides americanus* read *Picoides arcticus*.



A NUPTIAL PERFORMANCE OF THE SAGE COCK.

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A NUPTIAL PERFORMANCE OF THE SAGE COCK.

BY FRANK BOND.

Plate XII.

THE peculiar feathers of the breast of the Sage Cock (*Centrocercus urophasianus*) are more or less faithfully described by every ornithologist who has published a sketch of the bird; but as yet I have seen no explanation of the cause of the wearing away of the barbs and even shafts of the feathers of the lower neck. These feathers are worn away during that period of sexual excitement which causes many birds to develop odd and eccentric habits until the nuptial season is passed. The Sage Cock is unable to produce the musical booming sound of the Prairie Chicken, the forcible expulsion of the air from the sacks producing an inconsequential chuckling noise only; nevertheless the bird offers reasonable entertainment to any individual who will rise early and stroll out into the sage brush a hundred yards from the camp fire.

During the months of April and May the Sage Cocks are usually found in small flocks of a half dozen or more, stalking about with tails erect and spread after the manner of the strutting turkey cock, but I have never seen the Grouse dragging their wings upon the ground, turkey fashion, and in the manner described by Dr. Newberry in the quotation from this author

found on page 406 of Dr. Coues's 'Birds of the Northwest,' nor have I ever found a wing of a Sage Cock, in this or any other season, which exhibited the slightest wearing away of the primaries. Instead of dragging its wings upon the ground the Sage Cock will enormously inflate the air sacks of the neck until the whole neck and breast is balloon-like in appearance, then stooping forward, almost the entire weight of the body is thrown upon the distended portion and the bird slides along on the bare ground or short grass for some distance, the performance being concluded by the expulsion of the air from the sacks with a variety of chuckling, cackling or rumbling sounds. This performance is continued probably daily, during the pairing and nesting season, and of course the feathers are worn away by the constant friction.

The brush drawing (Plate XII) shows the position taken by the Sage Cock while engaged in the eccentric performance described above, while the line drawings show the effect of the sliding friction upon the feathers of the inflated area. These drawings (Figs. 1-3) were made of feathers taken from an old Sage Cock killed in December and the question arises—are these feathers ever moulted, and if so, when? Fig. 1 is the type of feather which almost surrounds the air sacks, when the same are exhausted,



for the space of an inch or more. These are evidently worn half away. Fig. 2 is a type of the next circlet below, and Fig. 3 of those just above (or just below when the bird stoops forward)

the black feathers of the breast which are untouched. The black and naked barbs shown in Fig. 2 give that portion of the breast its hairy or bristly appearance.

An effort to assign a cause for this peculiar habit of the Sage Cock would be entering the purely speculative field, but the sliding of the widely distended air sacks over an uneven surface, together with the additional rumbling produced by the stiffened worn-off feathers, undoubtedly produce, to the ears of the bird at least, a volume of sound that is simply tremendous. A spectator, however, can hear nothing until the air sacks are collapsed.



'APTOSOCHROMATISM.'

BY J. A. ALLEN.

IN 'Science' of Feb. 23, 1900 (N. S., XI, pp. 292-299) Mr. F. J. Birtwell describes at considerable length, what he considers a case of 'The Occurrence of Aptosochromatism in *Passerina cyanea*.' He says: "The following remarks upon Aptosochromatism of *Passerina cyanea*, although of insufficient importance to establish the phenomenon of color change without moult as a constant occurrence in the species, are conclusive enough, I am convinced, to prove the possibility of such a change, and are merely offered as such for what they may be worth." Several paragraphs, by way of introduction, relate to the general subject, in which Mr. Birtwell regrets that "Individual error and dogmatism have greatly retarded honest effort in this most important branch of ornithological science. It is a singular fact that certain individuals have conceived the idea that a feather once having passed its premature condition is utterly disconnected with the vital system of the bird, and such individuals cling to this belief with a tenacity wonderful to behold." His remarks, he tells us, "are based chiefly upon observations conducted during the fall, winter, and early spring of 1898-99, upon a captive bird." He presents a table

showing loss of feathers from Nov. 1 to Feb. 11, and adds that from Feb. 11 to Feb. 28 "an average of 50 contour feathers was lost daily," and that "the loss had abruptly ceased" by March 5. (The bird died March 29.) The total loss of contour feathers was estimated at 1350, or about three-fifths of the bird's entire plumage. He says: "To many observers my bird by March 5th would have been pronounced to be completely moulting." This feather loss he does not consider as normal, but as resulting indirectly from the bird's timid, fretful temperament, many of his feathers becoming more or less injured by his "wild fluttering" in the cage, and consequently shed, as, "when such a vital process as Aptosochromatism [with a big A] begins to work, these decrepit feathers necessarily would have to be renewed in order to take part in the general plan. . . . It will be noticed in the table how gradually the loss began, due doubtless to the gradual approach of activity towards color change in the feathers. It must be admitted that this explanation is purely hypothetical, but such a hypothesis, although not of fundamental importance, oft-times prepares the way for a clearer understanding of the problem under consideration."

"The first appearances of color change," he says, "were noticed in some of the old feathers of the crown during the first week in February," when "a brightening of the blue area of the feather was noticed, but no perceptible change of color at the tips where the russet was. . . . When the band of tawny was reached, it appeared to be slowly absorbed until but faint tips of this color could be seen upon the ends of the larger barbs. In no cases were the barbs or barbules broken off sufficiently to account for the change." After describing the general course and character of the color change over the body Mr. Birtwell sums up as follows: "While my bird threw out no hint whatever as to the constant occurrence of the color change, it did prove that the 'impossibility' is possible. It is certain that the heavy feather loss of my bird but indirectly helped the change: 1st, we have seen that many feathers changed which were not renewed by moult; 2d, we saw that those feathers which were renewed by direct gain and loss were colored similarly to those which preceded them, but that later on they changed Aptosochromatically, and 3d, no purely blue, *i. e.*,

changed feathers were found in an embryonic condition at any time, although frequent careful examinations of the bird were made." This, as will be noted later, is, taken altogether, a fine exposé of Mr. Birtwell's ignorance of what normally occurs in respect to color change without moult, or by simple normal abrasion. He goes on to say that in feathers examined under the microscope in January and February he "could detect no presence of carrier pigment cells and found the calamus of each feather to be in the expected dried up condition. The change would thus seem to be confined to activity in the feathers alone." (!)

His conclusions from this study are: "(1) that Aptosochromatism in my *Passerina cyanea* occurred beyond doubt, (2) that although present with severe feather loss it does not follow that the gain of color was directly responsible to it, as proved by careful examination of the newly acquired feathers, and (3) that although the feather loss was objectively independent of the Aptosochromatic change, it might subjectively be so, inasmuch as old and imperfect feathers were renewed for active and healthy ones, in which such a color change subsequently occurred."

Dr. J. Dwight, Jr., in a later number of 'Science' (April 30, 1900, pp. 627-630), under the title 'The Plumage and Moults of the Indigo Bunting,' reviews Mr. Birtwell's paper at some length, describing in detail the successive stages of plumage of this bird, and criticising with some sharpness the class of work Mr. Birtwell's paper so characteristically illustrates. After quoting some of Mr. Birtwell's comments on the attitude of the opponents of the theory of 'Aptosochromatism,' transcribed at the beginning of this review, in which he says "they cling to their belief with a tenacity wonderful to behold," Dr. Dwight says: "Doubtless it does seem 'wonderful' to persons who would wave aside all the careful observations that have been made upon feather growth and feather wear, and plumage generally, but possibly it is not so wonderful as the strange things they see just as soon as they watch a bird of striking colors in a cage." Dr. Dwight also indulges in some comment on the general subject. After his account of the changes of plumage in the Indigo Bunting, he says: "Here then we have the facts about the Indigo Bunting, and any

specimens taken at the proper time of year will verify them. Nevertheless, Mr. Birtwell thinks that 'for good results in investigations upon color change one should operate rather upon live birds in confinement.' Well, perhaps so, for the 'proof' of color change without moult certainly does rest chiefly upon caged birds. The fact that they moult irregularly and often at long intervals and, as for instance in the Purple Finch (*Carpodacus purpureus*), having once lost their bright colors may never regain them does not seem to impair belief in a theory fifty years or more old. It began when most people were ignorant of the fact that birds could and did moult twice in the year. This was sagely declared to be too great a drain upon their vitality; but when it was found that some species did moult twice, theory had to be reserved for others that did not appear to be guilty of draining their vitality. When these in turn were proved to moult twice refuge was taken in the assumption that only certain individuals of certain species changed color without moult. Later came red-handed proof of guilt in feathers found growing upon these individuals and the believers in theory fell back upon the claim that although one feather did seem to be renewed by moult, the one next to it underwent a color change, concerning the nature of which no two believers were agreed. Some of them have gone so far as to assert rejuvenation of frayed edges by some sort of exudative processes which only need to be carried a step farther to eliminate altogether the necessity of moult. This is no fancy picture and I only paint it that my readers may know what 'aptosochromatism' represents."

Referring more directly to Mr. Birtwell's article, Dr. Dwight remarks: "An observer who did not know the plumage differences between the adult and the young bird, nor discover the structural differences between autumnal and nuptial feathers, nor hesitate to look for 'carrier pigment cells' under the microscope, may well have his accuracy of observation questioned. . . . When the well-established laws of feather growth and feather loss fail to account for plumages, it will be time enough to adopt theories demanding new life in epidermal structures, that for many months have been histologically dead. The existence of such a thing as 'aptosochromatism' will hardly be proved by those who have no

grasp upon fundamental principles, and as long as such observers expect to be taken seriously, they must not be surprised if they are called sharply to account."

A careful study of Mr. Birtwell's paper has convinced me that there is nothing very unusual about Mr. Birtwell's caged Indigo Bunting. No 'hypothesis' is necessary to account for its moulting at the time it did, nor would Mr. Birtwell have thought any 'hypothesis' necessary if he had known the simple facts that the species normally moults twice a year, and that the prenuptial moult is ordinarily more or less incomplete. Nor is there anything in the color changes described incompatible with the belief that the changes observed were wholly due to the normal shedding of the tips of the feathers, both in the new feathers and in the old ones. The gradual wearing off of the tips of the feathers necessarily results in the exposure more and more of the previously concealed blue basal portion of the feathers underneath them, which would result in "the apparent brightening of the blue portion of the feather, beginning evenly on each vane from the bottom," as remarked by Mr. Birtwell. He further says: "When the band of tawny was reached, it appeared slowly to be absorbed until but faint tips of this color could be seen upon the ends of the larger barbs." Here almost certainly Mr. Birtwell's observations were in error, as he could easily have himself detected had he been familiar with the differences in structure between the fugacious buffy tip and the main body of the feather; although he gives it as his opinion that "in no case were the barbs or barbules broken off sufficiently to account for the change." There is nothing to indicate that Mr. Birtwell's bird was not a male of probably the second (possibly of the previous) year undergoing (1) the normal spring moult of the species and (2) gradually changing color, in case of both the old plumage and the new, by the usual wearing away of the fugacious brown feather tips and gradually exposing more and more of the previously concealed basal portions of the feathers, as occurs normally, to a greater or less extent, in hundreds of species of our birds, and so markedly in such species as the Snowflake, Bobolink, and many others that might be mentioned.

Mr. J. Lewis Bonhote has also shown of late much interest in

'aptosochromatism'; but, perhaps to his credit, is content with the more commonplace phrase 'colour-change' to designate "an alteration or rearrangement of pigment in the fully-grown feather," including as well "an influx of pigment into a fully formed feather." In 'The Zoölogist' for January, 1900 (pp. 29-31), he has a paper 'On the Moults and Colour Changes of the Corn-crake (*Crex pratensis*)," in which he points out that "the Corn-crake undergoes a complete moult in spring, the new dress resembling its winter plumage." He adds that "the slate-colour of the breeding-dress is, however, assumed immediately after the moult by a *change of colour*!" In a later paper, published in 'The Ibis' for July, 1900 (pp. 464-474), entitled 'On Moults and Colour-change in Birds,' he again refers to the Corn-crake, and cites this case as disproving the widely entertained belief that 'colour-change' relieves "the severer strain on the system" caused by moult since in this species there is both a spring moult and a 'colour-change.'

The paper just cited is called forth, Mr. Bonhote tells us, by "three recent papers on the subject which have appeared in American periodicals," these being (1) Dr. Chadbourne's in 'The Auk' (XIV, 1897, pp. 137-149) on the 'Spring Plumage of the Bobolink'; (2) a paper by the present writer published in 1896 (Bull. Am. Mus. Nat. Hist. VIII, pp. 13-44), entitled 'Alleged Changes of Color in the Feathers of Birds without Molting'; and (3) Mr. Witmer Stone's paper in the Proceedings of the Academy of Natural Sciences of Philadelphia (1896, pp. 108-167), on 'The Molting of Birds with Special Reference to the Plumages of the Smaller Land Birds of Eastern North America.' Mr. Bonhote, being an 'aptosochromatist,' finds much in Dr. Chadbourne's paper to approve, while the other two articles are made the subject of considerable adverse criticism. With regard to Mr. Stone's paper it is pointed out that it is incomplete, inasmuch as "the Limicolæ and Gamebirds have been left untouched." As Mr. Bonhote has considerable to say about some of the former, as the Ruff and the Golden Plover, it seems a little strange that he does not mention Mr. Chapman's paper on 'The Changes of Plumage in the Dunlin and Sanderling,' which immediately precedes in the same volume (Bull. Am. Mus. Nat. Hist., VIII, 1896, pp. 9-12) one of the papers to which he devotes attention.

Apropos of Dr. Chadbourne's paper on the Bobolink, Mr. Bonhote says: "The Bobolink is not the only bird in which the assumption of the breeding plumage varies in different individuals. From the head of *Larus ridibundus* I have taken at the same time new brown feathers and old feathers in process of change, while in other individuals *there has been a pure colour-change*. The Ruff is an instance of the change going on in *two different ways simultaneously*. The Ptarmigan, again, is another instance, and from the examples of this species which I have examined I think it doubtful whether it assumes any one of its plumages in a uniform manner. The fact that a bird will assume its breeding plumage in some feathers by a change of colour, and in others by a change of feather, *leads to the supposition* that pigment *can* find its way up an old and fully-grown feather. It does not seem to me unlikely that, at a certain season, pigment—which is chiefly a waste product, more abundant, on account of the extra energy expended, at the approach of spring—should be deposited in the follicles of the feathers. If the follicle is at that time engaged in producing a *new* feather, the pigment is placed in it; if not, *it is drawn up into the feather which is already full grown*!"

This quotation shows fairly Mr. Bonhote's position. Respecting the portions here placed in italic type, I beg to offer a few words of comment. First, as to the *Larus ridibundus*, it seems strange that I have never been able to detect, in any of the large number of specimens I have examined of its closely allied congeners, any "old feathers in process of change," but always, in birds taken at the proper season, plenty of new black feathers in all stages of growth. As to the Ptarmigan, I would call Dr. Bonhote's attention to Dr. Dwight's paper in the April number of this Journal, published before Mr. Bonhote's paper appeared. Dr. Dwight's whole article on 'The Moults of the North American Tetraonidæ' (Auk, XIII, 1900, pp. 34-51, 143-166), I hope will be not only read, but most critically studied by all who share Mr. Bonhote's views on 'colour-change.' Says Dr. Dwight (*l. c.*, pp. 147, 149): "The study of this material [just previously enumerated], amounting to nearly two hundred specimens, now enables me to explain the parti-colored plumages of these birds, a matter that has long baffled investigation and given rise to a belief

that individual feathers themselves change color without being moulted. It has been believed by some that Ptarmigans moult continuously and in a haphazard way during the whole year. All of these ideas have arisen from a misconception of the facts, which show that the feathers supposed to be changing color or pattern are of that particular color and pattern at the time they first expand, and that the continuous moult resolves itself into definite periods, and that the feather growth is systematic, differing in no respect from that of the rest of the Grouse. The one essential difference between the moults of the Ptarmigans and those of the Grouse is found in the extra moult in the autumn by which the brown feathers regularly assumed at the usual periods of moult in both young birds and old are replaced by white ones. . . .

"The plumages of the Ptarmigans are puzzling not only on account of the plumage intermediate between summer and winter dress, but also on account of the rapidity with which the moults follow each other, one beginning before the previous one is completed, and apparently overlapping at some points. Moreover, the incompleteness of the partial moults with the irregular retention of feathers peculiar to them adds to the confusion of ideas resulting from seeing together an assemblage of feathers belonging to several different stages of plumage. As for the rapidity with which one moult treads upon the heels of another, it can only be said that the mode of life of the Ptarmigans requires it and the activity of the feather papilla is no greater than the necessity. As a matter of fact, some papillæ produce approximately one feather in May, another in July and a third in September, but there are many which produce but two feathers during this period and others only one, while all of them are dormant during the long winters."

In respect to "the supposition that pigment *can* find its way up an old and fully-grown feather," Mr. Bonhote assumes that this supposition is true, and that, in the season of moult, "if the follicle [of a feather] is at that time engaged in producing a *new* feather, the pigment is placed in it; if not, *it is drawn up into the feather which is already full-grown.*" This latter affirmation, put forth as a statement of known fact, rests entirely upon a series of

wholly inadequate assumptions, namely: (1) the case of the Golden Plover, in which he says, "if a specimen be examined in spring, we find the white feathers on the breast in all stages of colour between white and black. Messrs. Allen and Stone would have us believe that these are all new feathers, which have grown of that colour, and which will always remain of that colour." In summer Mr. Bonhote finds that the "many birds in the full summer dress" that he has examined rarely have "more than one or two feathers in this half-and-half stage on any single individual." The conclusion reached is that the Golden Plover assumes the breeding dress "by direct moult" on the back while it acquires its black breast by the white feathers *turning black*. "The new growing feathers on the breast," he says, "are *white*, not black or particoloured, and then change to the black summer dress." I cannot say from personal observation what the European Golden Plover does, but the American Golden Plover and its near ally, the Black-breasted Plover, acquire the black breast feathers by a moult, as the examination of a large number of specimens has abundantly shown.¹ (2) As to the physiological process involved in this change of white feathers to black ones, Mr. Bonhote says: "I am not in a position to write about it at present, but should like to draw attention to a paper by M. V. Fatio, in which he shows that an oil is continually making its way into the feather from the body." As "most pigments are soluble in ether, alcohol, or chloroform," they are thus proved "to be of an oily nature. Now, if it has been proved that oil can make its way up a feather, and, further, that all true pigments (black, red, and their combinations) are of an oily nature, it necessarily follows that pigment can make its way up also." Yet it is admitted "that this flow is not due to any active agent, but to osmosis, capillarity, or some similar action"! We know the results of capillarity; its action is evident as a mechanical process in a thousand ways. But what has this to do, we may ask, with the

¹ Since this article was sent to the printer we have received the manuscript of Dr. Dwight's important paper, given later in this number of 'The Auk,' on the 'Moult of the North American Shore Birds (Limicolæ),' to which the reader's attention is especially called in reference to the Golden and Black-bellied Plovers.

(1) secretion of pigment by the vital action of a pigment secreting organ, and (2) the transmission of the pigment through the structure of a fully matured feather, and hence (according to the best histologists) a histologically dead organ. Because an oil or a dye can diffuse itself through a skein of yarn or over the external surface of a feather, and possibly penetrate its porous structure, Mr. Bonhote claims that such experiments "clearly prove that it is quite possible for pigment deposited at the *base of a feather* [just where and in what manner?] to work its way up by *purely physical means*. If an artificial pigment can do this, we need have no doubt that it is possible for a natural pigment to do the same."

Here, then, is the whole basis of the theory of 'color-change' in feathers, or 'aptosochromatism,' as set forth by one of its latest supporters; an assumption to my mind, resting: (1) on erroneous observation, and (2) on conjecture of what may or ought to happen if this belief in 'colour-change' were true. Victor Fatio's above cited observations and conclusions, published a generation ago, need not awaken much surprise, but it is a matter for astonishment that they should find supporters in this closing year of the nineteenth century.

Since Mr. Bonhote finds that I have "adduced no proofs in favour of non-colour change" in my paper on this subject published in 1896, it is hardly worth while to discuss the subject further in the present connection. In view of such a statement, however, I can hardly believe that my critic has given the paper in question very careful attention. As the subject is at present receiving renewed consideration, I am quite willing to await the results of expert investigators in this special line of research, both from the histological side and from the standpoint of the student of moult and plumage change in general. As Dr. Dwight, who has already spent years in the study of this subject, has well said: "When the well-established laws of feather growth and feather loss fail to account for plumages, it will be time to adopt theories demanding new life in epidermal structures, that for many months have been histologically dead."

NOTES ON THE BIRDS OF REFUGIO COUNTY,
TEXAS.

BY JAMES J. CARROLL.

THE following notes are based on observations made by the writer in Refugio County, southern Texas, during the winter and spring of each year since 1896. The list, while not complete, gives a very fair idea of the avifauna of the county. Refugio County is joined on the west by Bee County where observations have been made and results published by Messrs. Beckham and Sennett, and only a short distance north of Nueces County, which territory has been studied by such eminent ornithologists as Sennett, Hancock, Beckham and Chapman. The results of their researches have been published in the proceedings of various scientific societies.

The San Antonio and Aransas Rivers form respectively its northern and southern boundaries. The interior of the county is well watered by the Mission River and Blanco, Medio, Sauz, Melon, Copano and Chocolate Creeks and other small streams. There are also a number of large fresh water lakes which afford suitable winter habitation for many aquatic species. The eastern border is indented by the Heines Bay, and the southern by the Mission and Copano Bays. The country is flat, has little elevation and is for the most part a prairie, covered more or less with chaparral. There are some groves, however, of red oak (*Quercus rubra texana*), post oak (*Q. stellata*), and live oak (*Q. virens*), which cover considerable areas. The rivers are heavily fringed with the pecan (*Carya olivæformis*), cottonwood (*Populus monilifera*), etc. A broad belt of territory bordering the coast is well timbered with mesquite (*Prosopis juliflora*). The 'mottes' mentioned so frequently are composed of the hackberry (*Celtis occidentalis*) and anaqua (*Ehretia elliptica*), and are dispersed over the prairies at varying intervals. Other trees occurring commonly are huisache (*Acacia farnesiana*), granjeno (*Celtis pallida*), etc.

These brief preliminary and explanatory remarks the writer has

thought, will enable the reader to better understand certain parts of this paper.

1. *Larus argentatus smithsonianus*. AMERICAN HERRING GULL.—Common on the bays in winter.

2. *Larus delawarensis*. RING-BILLED GULL.—Also common on the bays during winter.

3. *Larus atricilla*. LAUGHING GULL.—Very common resident near the bays. Breeds commonly on the islands during the latter half of June.

4. *Sterna caspia*. CASPIAN TERN.—Tolerably common on the bays. Breeds on the islands in May and June.

5. *Sterna maxima*. ROYAL TERN.—Much commoner than *S. caspia*, which it so closely resembles. Breeding localities and dates about the same.

6. *Gelochelidon nilotica*. GULL-BILLED TERN.—Tolerably common breeder on the islands.

7. *Sterna forsteri*. FORSTER'S TERN.—Common on the bays. Breeds.

8. *Sterna antillarum*. LEAST TERN.—Not very common.

9. *Hydrochelidon nigra surinamensis*. BLACK TERN.—Have found this Tern to be rare; frequents inland ponds. Though they remain as late as May, have never found them breeding.

10. *Rynchops nigra*. BLACK SKIMMER.—One of the most common birds on the bays, breeding in great numbers on the islands in May and June. Local name 'Shearwater.'

11. *Anhinga anhinga*. ANHINGA.—Not rare, nor yet very common. I have seen quite a number on the Arroya Chocolate, which is well fringed with trees, in May, and I think it very probable that they breed there, though I have not found a nest. Have been told by competent observers that they breed in the county. Local name, 'Water Turkey.'

12. *Phalacrocorax mexicanus*. MEXICAN CORMORANT.—Fairly common along the beaches. Have seen them in May but did not find them breeding.

13. *Pelecanus erythrorhynchos*. AMERICAN WHITE PELICAN.—A very common species during the winter months and until late spring. They then congregate in great numbers and migrate.

14. *Pelecanus fuscus*. BROWN PELICAN.—Very common at all seasons in all the bays. Breeding season extends over several months, beginning in February. Nests on the islands.

15. *Lophodytes cucullatus*. HOODED MERGANSER.—Rather uncommon winter resident. Local name, 'Sawbill.'

16. *Anas boschas*. MALLARD.—A very common winter resident, abounding in the prairie ponds and lakes. Local name, 'Greenhead.'

17. *Anas fulvigula maculosa*. MOTTLED DUCK.—A fairly common resident. Breeds along the mainland near the beach and on the islands, in April.

18. *Chaulelasmus streperus*. GADWALL. — Common winter resident.
19. *Mareca americana*. BALDPATE. — Fairly common in winter in the prairie ponds and lakes.
20. *Nettion carolinensis*. GREEN-WINGED TEAL. — Common in prairie lakes and ponds, in winter.
21. *Querquedula discors*. BLUE-WINGED TEAL. — Found plentifully in the inland ponds during winter.
22. *Spatula clypeata*. SHOVELLER. — A common creek and pond Duck. Have seen them in pairs in summer in the grassy lakes and think they breed, though I have found no nests. Local name, 'Spoonbill.'
23. *Dafla acuta*. PINTAIL. — One of the commonest of the Ducks; abounds on the bays and also on inland lakes and ponds. Local name, 'Sprig.'
24. *Aythya americana*. REDHEAD. — The abundance of these Ducks and *A. vallisneria* is governed by the quantity of wild celery growing in the bays, upon which they feed. Last winter (1899-1900), there being a most abundant celery crop, these two species were quite common.
25. *Aythya vallisneria*. CANVAS-BACK. — Like the preceding, very variable as to numbers. Both the present species and *A. americana* are much sought by the hunters because of the great demand for them. The winter of 1895-96 found Canvas-backs rare, and the local hunters were paid for them at Rockport, \$5 per pair.
26. *Aythya affinis*. LESSER SCAUP. — Very common in the bays in winter.
27. *Charitonetta albeola*. BUFFLEHEAD. — A very common pond and creek Duck in winter.
28. *Chen hyperborea nivalis*. SNOW GOOSE. — By far the most common Goose of the county. It abounds everywhere in the vicinity of water; in prairie ponds, lakes and on the bays. Local name, 'Brant.'
29. *Anser albifrons gambeli*. AMERICAN WHITE-FRONTED GOOSE. — Fairly common during winter. Known locally as 'Speckled Brant.'
30. *Branta canadensis*. CANADA GOOSE. — Common during the winter in the bays.
31. *Branta canadensis hutchinsii*. HUTCHINS'S GOOSE. — Very common in the prairie ponds and lakes.
32. *Olor columbianus*. WHISTLING SWAN. — Formerly very common winter resident, but of late years becoming exceedingly rare, and the few that come are very shy. This is because of the persecution by hunters.
33. *Ajaja ajaja*. ROSEATE SPOONBILL. — These exquisite birds I have seen but a few times. They are becoming very rare. Called locally 'Flamingo.'
34. *Ardetta exilis*. LEAST BITTERN. — Tolerably common in the marshes and along water courses. Breeds.
35. *Ardea herodias*. GREAT BLUE HERON. — Still comparatively common, but is being rapidly exterminated by plume hunters. They are found wherever there is water; in the bays, prairie lakes, and ponds, and

along creeks and rivers. Breeds in colonies on the islands and also on the mainland far inland. On the islands the nests are placed in cactus, 'Spanish dagger,' in chaparral, or on the ground. On the mainland, chaparral and small trees are used. Breed from February till May or June. Local name, 'Big Silver-gray Heron.'

36. *Ardea egretta*. AMERICAN EGRET.—Rather uncommon. Has become so within the last few years.

37. *Ardea candidissima*. SNOWY HERON.—One of the species much warred upon by the plume hunters. Hence they are fast becoming scarce. Breeds.

38. *Ardea rufescens*. REDDISH EGRET.—Not very common. Breeds.

39. *Ardea cærulea*. LITTLE BLUE HERON.—Not common, resident.

40. *Ardea virescens*. GREEN HERON.—Very common. Frequents ponds and streams. Breeds abundantly in May. Local name, 'Little Silver-gray Heron.'

41. *Nycticorax nycticorax nævius*. BLACK-CROWNED NIGHT HERON.—Common along the water courses. Breeds commonly in May. Local name, 'Qua Bird.'

42. *Grus americana*. WHOOPING CRANE.—A rather rare winter migrant. Have never seen more than half a dozen in company. Are seen feeding in the shallow prairie ponds and are very wary.

43. *Grus mexicana*. SANDHILL CRANE.—When acorns are in plenty, these Cranes are very common in winter, remaining until late spring. Frequent the oak timber, the prairie and ponds.

44. *Porzana carolina*. SORA.—Saw one of this species in a marsh in May, 1899.

45. *Fulica americana*. AMERICAN COOT.—Tolerably common winter resident. Do not think they remain to breed. Local name, 'Bulldoo.'

46. *Recurvirostra americana*. AMERICAN AVOCET.—Tolerably common.

47. *Himantopus mexicanus*. BLACK-NECKED STILT.—A very common resident on the bays and prairie ponds. Breeds in May.

48. *Gallinago delicata*. WILSON'S SNIPE.—A very plentiful winter resident in all marshy ponds.

49. *Tringa fuscicollis*. WHITE-RUMPED SANDPIPER.—Frequents small ponds during winter months.

50. *Tringa minutilla*. LEAST SANDPIPER.—Tolerably common winter migrant.

51. *Tringa alpina pacifica*. RED-BACKED SANDPIPER.—Common in winter.

52. *Ereunetes pusillus*. SEMIPALMATED SANDPIPER.—Winter resident.

53. *Calidris arenaria*. SANDERLING.—Winter resident.

54. *Totanus melanoleucus*. GREATER YELLOW-LEGS.—Found in small ponds and along water courses in winter.

55. *Totanus flavipes*. YELLOW-LEGS.—Common winter resident.

56. *Symphemia semipalmata inornata*. WESTERN WILLET. — Winter resident. Do not think it breeds.

57. *Bartramia longicauda*. BARTRAMIAN SANDPIPER. — One of the commonest migrants. Very plentiful during migration. In spring of 1899, arrived March 13, and by the 20th was everywhere on the prairies. Local name, 'Plover.'

58. *Numenius longirostris*. LONG-BILLED CURLEW. — A very common migrant; frequenting the prairies. Saw several flocks containing thousands, Nov. 30, 1899.

59. *Charadrius dominicus*. AMERICAN GOLDEN PLOVER. — A very common migrant. Both this species and *B. longicauda* are much hunted for the market. Preëminently a bird of the prairie.

60. *Ægialitis vocifera*. KILLDEER. — Common at all seasons though their numbers are greatly augmented during winter by the migrants from the north. Breed from February to May.

61. *Ægialitis nivosa*. SNOWY PLOVER. — Occurs as a migrant.

62. *Ægialitis wilsonia*. WILSON'S PLOVER. — Tolerably common. May breed, though I have not found a nest.

63. *Arenaria interpres*. TURNSTONE. — Found on the beaches in winter.

64. *Hæmatopus palliatus*. AMERICAN OYSTER-CATCHER. — A very common beach bird, breeding on the islands.

65. *Colinus virginianus texanus*. TEXAN BOBWHITE. — A very abundant resident. Especially common in the chaparral. Also in the high weeds and grass fringing the Aransas River. Breeds commonly in April, May and June.

66. *Tympanuchus americanus attwateri*. ATTWATER'S PRAIRIE HEN. — Formerly abundant but of late years becoming rare. Still a good number are to be found in Roseborough's pasture near Salt Creek. It is fair to presume it breeds there.

67. *Meleagris gallopavo intermedia*. RIO GRANDE TURKEY. — Not so common as a few years ago. I have found a few in the 'Black Jacks,' a region of brush and timber near St. Charles Bay. Possibly a few still remain in the bottoms of the Mission River.

68. *Zenaidura macroura*. MOURNING DOVE. — An exceedingly abundant resident. Possibly more are present in winter, at which season they are gregarious, than in summer. Breed commonly, on the ground and in bushes. A nest containing young was found the second week in January, 1900.

69. *Cathartes aura*. TURKEY VULTURE. — Common resident. An abundant breeder, selecting brush-heaps, clumps of chaparral, caves in arroya banks, and hollow trees as nesting sites, though the hollow trees are used far less by this species than by *C. urubu*. Breeds in April and May.

70. *Catharista urubu*. BLACK VULTURE. — By far the most common of our two Vultures. Constant resident. Nests in hollow trees, under

thick chaparral, and by sides of fallen trees. Nidification season begins earlier with the present species than with *C. aura*, complete sets being found as early as the first half of February.

71. *Elanoides forficatus*. SWALLOW-TAILED KITE. — A rare migrant. Have seen but two or three in the county. Saw one March 29, 1899; another April 6 of the same year. The tall pecan trees bordering the San Antonio River afford most admirable nesting sites, but so far as I can learn, they have never bred in the county.

72. *Ictinia mississippiensis*. MISSISSIPPI KITE. — A very common migrant. Arrived March 6, in 1899. Does not breed.

73. *Circus hudsonius*. MARSH HAWK. — A common winter resident; none remain to breed.

74. *Accipiter velox*. SHARP-SHINNED HAWK. — Rare migrant. Have seen but one and found that dead.

75. *Accipiter cooperi*. COOPER'S HAWK. — Tolerably common in winter. Do not remain in summer.

76. *Parabuteo unicinctus harrisi*. HARRIS'S HAWK. — Common resident. Becomes more common near the coast. Have never seen them in company with *P. cheriway*, nor eating carrion as mentioned by previous writers. Have found their nests in chaparral, scarcely eight feet from the ground, and in the tops of tall trees. Are early breeders, beginning to lay sometimes as early as January. So far as my experience goes, the complement of eggs is more often three or four than two, and immaculate eggs are much commoner than marked ones.

77. *Buteo borealis*. RED-TAILED HAWK. — Not very common, the succeeding subspecies being the predominant variety. Habits identical.

78. *Buteo borealis krideri*. KRIDER'S HAWK. — Rather common resident. Could not be more typical; no subterminal bar; underparts snow-white. Breeding habits similar to those of *borealis*, the main difference being that *krideri* more often places green leaves in its nest. Nidification begins in the latter part of February.

79. *Buteo lineatus alleni*. FLORIDA RED-SHOULDERED HAWK. — Tolerably common in winter. I think none remain to breed.

80. *Buteo albicaudatus sennetti*. WHITE-TAILED HAWK. — Common resident. Frequents the open prairie, which characteristic gives them the local name, 'Prairie Hawk.' Are not molested by ranchmen, who take into consideration their good offices in disposing of noxious mammals. Breed in April and May, placing their nests in top of chaparral or a small tree on the prairie. Eggs two, rarely three, marked eggs being unusual.

81. *Buteo swainsoni*. SWAINSON'S HAWK. — Very common migrant. In spring of 1899 arrived March 28, and was seen in great numbers for two weeks, frequenting alike prairie and wooded land. Their number in 1899 was unusually great.

82. *Aquila chrysaetos*. GOLDEN EAGLE. — Perhaps I should note this Eagle as of doubtful identification, as I did not take the specimen, and it is

so far south of its usual range. But I am almost positive that it was *A. chrysaëtos*, being familiar with all plumages of *H. leucocephalus*. I saw but one, in 1896, and have not seen it since.

83. *Haliaeetus leucocephalus*. BALD EAGLE. — By no means rare. Pre-eminently a bird of the prairie. At Willow Lake, during the duck season, I have seen as many as a dozen at once. Their chief diet in winter consists of Ducks and Geese which have been winged by gunners. Nests invariably in the vicinity of prairie ponds. Breeds early—November and December. Nests placed in low trees, sometimes at no greater distance from the ground than 15 feet. Eggs two, very rarely three.

84. *Falco peregrinus anatum*. DUCK HAWK. — Rather uncommon winter resident.

85. *Falco columbarius*. PIGEON HAWK. — Rare winter resident. Have seen a few. The stomach of one killed Jan. 21, 1898, contained the remains of small Sparrow.

86. *Falco richardsoni*. RICHARDSON'S MERLIN. — Very rare.

87. *Falco sparverius*. AMERICAN SPARROW HAWK. — Not rare in winter. None remain through the summer. The winter residents are largely reinforced in early April by migrants from the south. Then all pass northward.

88. *Polyborus cheriway*. AUDUBON'S CARACARA. — Very common resident. I think some pass the winter further south, as they seem more numerous in summer than in winter. Breeds from February until June. Nest in chaparral and small trees on prairie; rarely in edge of timber; never, I think, in the woods. Local name, 'Mexican Buzzard'; called by the Mexicans, 'Totache.'

89. *Pandion haliaëtus carolinensis*. AMERICAN OSPREY. — Not common. In fact I have seen only one in the county, Nov. 25, 1899, on St. Charles Bay. Natives tell me that they are not as common as formerly, and that they once bred here. Local name, 'Fish Hawk.'

90. *Strix pratincola*. AMERICAN BARN OWL. — Not common. Found one frozen during the winter of 1897-98. Formerly bred in caves in arroya banks. Possibly they do yet, but I have not found them so doing.

91. *Asio accipitrinus*. SHORT-EARED OWL. — Saw a single specimen in the spring of 1899.

92. *Syrnium nebulosum helveolum*. TEXAN BARRED OWL. — Tolerably common resident in all parts of the county, especially so in the bottoms of the San Antonio River. Breeds in March.

93. *Megascops asio mcalli*. TEXAN SCREECH OWL. — Rather rare. Have seen but few. Breeds in March and April.

94. *Bubo virginianus pallescens*. WESTERN HORNED OWL. — Very common resident. Adopts the nests of Buteos and Caracaras. Breeding begins in January. Have found their nests far out in the prairie in small mottes, miles from timber.

95. *Speotyto cunicularia hypogæa*. BURROWING OWL. — Very com-

mon during the winter months, though I think none remain to breed. Have been told that they do, but I doubt it.

96. *Geococcyx californianus*. ROADRUNNER. — Observations made in every part of the State where the Roadrunner occurs convince me that in this and counties contiguous, it is commoner than in any other section. Breeds from March until June, possibly later, in chaparral, cactus and small trees. Local name, 'Chaparral Bird'; Mexican name, 'Paisano.'

97. *Coccyzus americanus*. YELLOW-BILLED CUCKOO. — Common summer resident. In spring of 1899 arrived April 18. Breeds in May and June. Sets of five eggs not uncommon.

98. *Ceryle alcyon*. BELTED KINGFISHER. — Rather uncommon resident. A few seen along the Arroyos Medio and Blanco. Breeds in the high banks of the Blanco.

99. *Dryobates scalaris bairdi*. TEXAN WOODPECKER. — Much the commonest of the Picidæ. Occurs commonly in prairie mottes, in deep woods, and trees along streams. Nests early, making the excavation in the small dead branches of trees, usually near the top, or in fence-posts. Local name, 'Speckle-check.'

100. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER. — Rare winter resident. Have seen only one, — the latter part of November, 1899.

101. *Melanerpes aurifrons*. GOLDEN-FRONTED WOODPECKER. — This species and *D. s. bairdi*, so far as my knowledge goes, are the only resident Woodpeckers in the county. Not so common as the above mentioned species. Breeds in dead stubs in April.

102. *Colaptes auratus*. FLICKER. — Rare migrant. The only bird noted was a single male, March 17, 1899.

103. *Antrostomus carolinensis*. CHUCK-WILL'S-WIDOW. — Tolerably common migrant. In 1899, arrived March 17. Think possibly some remain the entire winter.

104. *Nyctidromus albicollis merrilli*. MERRILL'S PARAUQUE. — Not common. Breeds sparingly. Local name, 'Whip-poor-will.'

105. *Chordeiles virginianus henryi*. WESTERN NIGHTHAWK. — Very common summer resident. In 1899, arrived April 14. Breeds commonly on the prairies in May and June. Local name, 'Bull-bat.'

106. *Chordeiles acutipennis texensis*. TEXAN NIGHTHAWK. — Not so common as *C. v. henryi*. In 1899, arrived April 11. Breeds.

107. *Chætura pelagica*. CHIMNEY SWIFT. — Common migrant. In 1899, arrived April 4.

108. *Trochilus colubris*. RUBY-THROATED HUMMINGBIRD. — Very common during migrations. In 1898, arrived March 25; in 1899, March 13. Some remain throughout the summer, though I have never found a nest here.

109. *Trochilus alexandri*. BLACK-CHINNED HUMMINGBIRD. — Common during migrations. In 1899 it arrived April 11.

110. *Milvulus forficatus*. SCISSOR-TAILED FLYCATCHER. — Abundant

summer resident. In 1898, arrived March 12; in 1899, March 13. Breeds in great numbers in the chaparral and prairie mottes. Local name, 'Spanish Mockingbird.'

111. *Tyrannus tyrannus*. KINGBIRD. — Very common in migration seasons. Quite a number remain throughout the summer. For ten or twelve years, a pair of Kingbirds have placed their nest in the same tree, on the identical spot on the same branch, each successive year. Is it the same pair each year? In 1899, arrived April 7.

112. *Myiarchus crinitus*. CRESTED FLYCATCHER. — Rare summer resident. Much more common during migrations. In 1898, arrived March 30; in 1899, March 13.

113. *Sayornis phœbe*. PHŒBE. — Not a very common migrant.

114. *Contopus virens*. WOOD PEWEE. — Very abundant during migrations. In 1899, arrived April 17.

115. *Otocoris alpestris giraudi*. TEXAN HORNED LARK. — Tolerably common. Seems to have great attachment for certain localities. At a certain point on the road about four miles from the Refugio Mission, I seldom fail to find them. Breeds in May.

116. *Corvus americanus*. AMERICAN CROW. — A few frequent the bottoms of the San Antonio River.

117. *Molothrus ater*. COWBIRD. — Common winter resident; associating with *Quiscalus macrourus* and *Scolecophagus cyanocephalus*.

118. *Molothrus ater obscurus*. DWARF COWBIRD. — Very common. Imposes upon the Lark Sparrow more frequently than on any other bird.

119. *Xanthocephalus xanthocephalus*. YELLOW-HEADED BLACKBIRD. — Very rare. Saw one in winter of 1895-96.

120. *Agelaius phœniceus*. RED-WINGED BLACKBIRD. — Common resident. Breeds in prairie ponds in company with *Quiscalus macrourus*, in May and June.

121. *Sturnella magna*. MEADOWLARK. — Tolerably common summer resident, breeding in May.

122. *Sturnella magna neglecta*. WESTERN MEADOWLARK. — Abundant winter resident and a great destroyer of corn crops at planting time.

123. *Icterus spurius*. ORCHARD ORIOLE. — Very common during migrations. In 1899, arrived April 11. Few remain to breed, placing their nests in mesquite trees near the coast.

124. *Icterus galbula*. BALTIMORE ORIOLE. — Tolerably common migrant. In 1899, arrived April 15.

125. *Icterus bullocki*. BULLOCK'S ORIOLE. — Rather rare summer resident. Breeds in May.

126. *Scolecophagus carolinus*. RUSTY BLACKBIRD. — A good many seen during migrations. In 1899, arrived March 3.

127. *Scolecophagus cyanocephalus*. BREWER'S BLACKBIRD. — One of the most abundant winter residents; seen much in company with *Quiscalus macrourus*. Remains until late spring.

128. *Quiscalus quiscula æneus*. BRONZED GRACKLE. — Common in migration season. In 1899, arrived March 3. Found a few pairs breeding with the colony of *Q. macrourus* in June, 1898.

129. *Quiscalus macrourus*. GREAT-TAILED GRACKLE. — Abundant at all times. A common pest. Breeds in immense colonies in May and June. Nests placed in small trees in prairie mottes or in weeds in ponds, about three to five feet above water. Local name, 'Jackdaw.'

130. *Poœcetes gramineus confinis*. WESTERN VESPER SPARROW. — Tolerably common.

131. *Ammodramus sandwichensis*. SAVANNA SPARROW. — Not very common. One taken April 2, 1898.

132. *Ammodramus savannarum perpallidus*. WESTERN GRASSHOPPER SPARROW. — Rare summer resident. Nest containing five fresh eggs was found in May, 1898.

133. *Ammodramus maritimus sennetti*. TEXAN SEASIDE SPARROW. — Rather rare, occurring sparingly along the bays.

134. *Chondestes grammacus*. LARK SPARROW. — Very common. Summer resident. Arrived in 1899, March 15. Nests indiscriminately on the ground, in chaparral or in small trees.

135. *Zonotrichia leucophrys*. WHITE-CROWNED SPARROW. — Tolerably common winter resident. Associates with *Spizella pallida*.

136. *Spizella pallida*. CLAY-COLORED SPARROW. — Common winter resident.

137. *Spizella pusilla*. FIELD SPARROW. — Common winter resident.

138. *Junco hyemalis*. SLATE-COLORED JUNCO. — A few seen in winter. Not common.

139. *Peucea cassini*. CASSIN'S SPARROW. — Tolerably common. Breeds in April and May.

140. *Melospiza lincolni*. LINCOLN'S SPARROW. — Common during migrations. In 1899, arrived March 14.

141. *Cardinalis cardinalis canicaudus*. GRAY-TAILED CARDINAL. — Common resident. Breeds in April, May, and June.

142. *Pyrhuloxia sinuata*. TEXAN CARDINAL. — Not common. Breeds sparingly.

143. *Cyanospiza cyanea*. INDIGO BUNTING. — Common migrant. In 1899, arrived April 15.

144. *Cyanospiza ciris*. PAINTED BUNTING. — Rather uncommon summer resident. Breeds in May. In 1899, arrived April 17.

145. *Spiza americana*. DICKCISSEL. — Very common migrant. Do not think any remain to breed. In 1899, arrived April 15.

146. *Calamospiza melanocorys*. LARK BUNTING. — Very common winter resident. Gregarious. Frequents the chaparral.

147. *Piranga rubra*. SUMMER TANAGER. — Rather scarce migrant. In 1899, arrived April 17.

148. *Progne subis*. PURPLE MARTIN. — Rather common summer resident. In 1899, arrived April 6.

149. *Petrochelidon lunifrons*. CLIFF SWALLOW. — Common migrant. In 1899, arrived March 25.

150. *Hirundo erythrogastra*. BARN SWALLOW. — Very common during migrations. In 1899, arrived April 27.

151. *Tachycineta bicolor*. TREE SWALLOW. — Very common migrant. In 1899, arrived March 30.

152. *Stelgidopteryx serripennis*. ROUGH-WINGED SWALLOW. — Common migrant.

153. *Ampelis cedrorum*. CEDAR WAXWING. — Two flocks containing several hundred individuals each were seen February 27, 1899.

154. *Lanius ludovicianus excubitorides*. WHITE-RUMPED SHRIKE. — Very common in winter, frequenting the chaparral. None remain to breed.

155. *Vireo olivaceus*. RED-EYED VIREO. — Tolerably common migrant. In 1899, arrived April 4. Others were seen on the 17th.

156. *Vireo flavifrons*. YELLOW-THROATED VIREO. — Rather uncommon migrant. In 1898, arrived Apr. 1; in 1899, Apr. 11.

157. *Vireo noveboracensis*. WHITE-EYED VIREO. — Common during migrations. In 1899, arrived March 15. Rare summer resident, breeding in May.

158. *Vireo bellii*. BELL'S VIREO. — Tolerably common migrant. Rare summer resident, breeding in April.

159. *Mniotilta varia*. BLACK AND WHITE WARBLER. — Common migrant. In 1898, arrived March 31; in 1899, March 13.

160. *Compsothlypis americana*. PARULA WARBLER. — Very abundant migrant. In 1899, arrived March 13; another wave April 15.

161. *Dendroica aestiva*. YELLOW WARBLER. — Usually a tolerably common migrant. Failed to observe any in 1899.

162. *Dendroica coronata*. MYRTLE WARBLER. — Very common migrant. In 1899, arrived March 13; a few more were seen on April 15.

163. *Dendroica maculosa*. MAGNOLIA WARBLER. — Rather uncommon migrant. In 1898, arrived May 14.

164. *Dendroica blackburniæ*. BLACKBURNIAN WARBLER. — Rather uncommon migrant. Arrived in 1899, March 13; another wave April 17.

165. *Dendroica dominica albilora*. SYCAMORE WARBLER. — Uncommon migrant. In 1899, arrived March 13; a few more April 15.

166. *Dendroica virens*. BLACK-THROATED WARBLER. — Tolerably common migrant. In 1899, arrived April 17.

167. *Seiurus noveboracensis*. WATER-THRUSH. — Common migrant. In 1899, arrived April 15.

168. *Seiurus motacilla*. LOUISIANA WATER-THRUSH. — An uncommon migrant. In 1899, arrived March 17.

169. *Geothlypis trichas*. MARYLAND YELLOW-THROAT. — Common migrant. In 1899, arrived April 15.

170. *Icteria virens*. YELLOW-BREASTED CHAT. — Migrant. Not common. In 1899, arrived April 11.

171. *Wilsonia mitrata*. HOODED WARBLER. — Common migrant. In 1898, arrived March 30; in 1899, March 13.

172. *Setophaga ruticilla*. AMERICAN REDSTART. — Common migrant. In 1899, arrived April 15.

173. *Oroscoptes montanus*. SAGE THRASHER. A few seen in winter.

174. *Mimus polyglottos*. MOCKINGBIRD. — Abundant resident. Breeds in the chaparral and small trees in prairie mottes, in April, May, and June.

175. *Galeoscoptes carolinensis*. CATBIRD. — Common migrant.

176. *Harporhynchus curvirostris*. CURVE-BILLED THRASHER. — Uncommon summer resident. Breeds in May.

177. *Thryothorus bewickii bairdi*. BAIRD'S WREN. — Tolerably common resident.

178. *Parus bicolor texensis*. TEXAN TUFTED TITMOUSE. — Very common.

179. *Parus carolinensis agilis*. PLUMBEOUS CHICKADEE. — Not common.

180. *Auriparus flaviceps*. VERDIN. — Uncommon summer resident.

181. *Poliophtila cærulea*. BLUE-GRAY GNATCATCHER. — Common winter resident. Reinforced March '13, 1899, by migrants from the south. Does not remain through the summer.

182. *Hylocichla mustelina*. WOOD THRUSH. — Common migrant. In 1899, arrived April 17.

183. *Hylocichla fuscescens*. WILSON'S THRUSH. — Not a very common migrant. In 1898, arrived May 12. Saw none in 1899.

184. *Merula migratoria*. ROBIN. — In severe seasons, a common winter resident. When the winters are mild, none or very few are present.

185. *Sialia sialis*. BLUEBIRD. — A few spend the winter.

THE BIRDS OF CAPE DISAPPOINTMENT, WASHINGTON.

BY WILLIAM H. KOBBE.

THE following birds were collected by me upon Cape Disappointment during the first six months of 1898, although my notes and observations extend over a much longer period. All the birds enumerated in the list are now in my collection, with the exception of those mentioned as being identified by other means.

For a fuller and more complete introduction I beg the reader to refer to my article upon the Rufous Hummingbird in the January number of 'The Auk' for this year. By so doing a better idea of the general aspect, climate, vegetation, etc., of the cape might be gained.

1. *Æchmophorus occidentalis*. WESTERN GREBE.—This species is abundant throughout the winter months, arriving soon after the rainy season begins in September or October and departing in March or April. It was the only species of Grebe found by me upon the cape and much preferred the bay to the fresh water lake formed by the heavy rains.

2. *Gavia lumme*. RED-THROATED LOON.—One specimen of this species was killed by me on Feb. 8, 1898. Upon skinning, it proved to be a female in immature plumage. Although this is the only specimen of any Loon in my collection, shot upon the cape, I am certain that other species occur there in abundance. I have seen a great many Loons upon the bay and have good reasons for believing them to be in all probability *Gavia pacifica* (Pacific Loon).

3. *Larus occidentalis*. WESTERN GULL.—The Western Gull is exceedingly abundant during the winter, and although I have frequently seen individuals during the summer, they are not at all common at that time of year. Doubtless other species occur upon the cape, but I have never shot any.

4. *Puffinus griseus*. DARK-BODIED SHEARWATER.—Very rare. One specimen of this bird was killed on May 6, 1898. It was an adult female and the following entry was made in my notes concerning it: "*Puffinus griseus*. Killed on May 6, 1898, at Fort Canby, Wash., mouth of the Columbia River. Sex and age: ♀ ad. Measurements and colors: $18\frac{5}{8} \times 41\frac{1}{2} \times 12$ inches. Eyes very dark yellowish brown, almost black; bill dusky bluish horn color, blackening along culmen; toes and tarsi bluish. This specimen was given to me by a surfman of the U. S. Life Saving

Crew at this place, who killed it with an oar, after driving it up against a fish net." This species is said to be abundant near Tillamook lighthouse, which is about twenty miles south of Cape Disappointment.

5. *Phalacrocorax dilophus cincinatus*. WHITE-CRESTED CORMORANT. — This Cormorant is a very abundant species during the entire year, but especially so in the winter and spring. They are rather wary birds to hunt, but may always be shot while sitting upon the stakes which support the fish pots. They sometimes perch upon these poles for hours and oftentimes may be seen with their wings half spread, by which means they dry them. Although the birds remain throughout the summer, I did not find them nesting upon the numerous cliffs of the cape and am certain they do not breed in this locality. This species is without doubt the one referred to by Mr. R. H. Lawrence in his list of birds of Gray's Harbour which appeared in 'The Auk,' Vol. IX, 1892, p. 353.

6. *Phalacrocorax pelagicus robustus*. VIOLET-GREEN CORMORANT. — The Violet-green Cormorant is only found upon the cape during the winter months, when it is very abundant. It arrives in the fall and departs rather late in the spring. During its stay upon the cape it associates with the White-crested Cormorant and the two species may often be seen perched upon the fish-trap poles in large flocks. Both species frequently fly into the fish pots from which they are unable to escape, since they are unable to fly vertically upward. It is an easy matter for the birds to fly from the poles downward into the square pot formed of netting, but after they once get in they are forced to remain and are generally killed by the fishermen.

7. *Merganser serrator*. RED-BREASTED MERGANSER. — Rare. Only two specimens shot during fall migration of 1897.

8. *Anas boschas*. MALLARD. — Not abundant. A few flocks occasionally seen upon the lake during migrations.

9. *Nettion carolinensis*. GREEN-WINGED TEAL. — Rare. One specimen killed by me out of a flock of three driven upon the ocean beach by a severe storm. This was during the winter.

10. *Dafila acuta*. PINTAIL. — This species is sometimes seen upon the lake, but very rarely and then only during the winter.

11. *Aythya vallisneria*. CANVAS-BACK. — This is the only species of the subfamilies Anatinae and Fuligulinae which may be said to really inhabit the cape, with the exception of the Scoters (*Oidemia*). The Canvas-backs arrived in November, 1897, and remained until the following March. There were immense flocks of them upon the bay, but after a few months they became very 'fishy' and unfit for the table.

12. *Oidemia perspicillata*. SURF SCOTER. — A very abundant species. One of the first Ducks to arrive in September and the last to leave in April. Feeds extensively on mussels and always swallows the shells, some of them being empty or else filled with mud. When rowing upon the bay on a bright, or at least not a stormy day, large flocks of these Ducks are often frightened at the approach of the boat and take to wing.

only to settle a short distance ahead. Upon these occasions the loud whistling of their rapid wing beats can be heard a long distance—a half mile or more if the weather is very calm.

13. *Oidemia deglandi*. WHITE-WINGED SCOTER.—This species associates in large flocks with *Oidemia americana*, and all statements made concerning the latter will apply equally well to *Oidemia deglandi*.

14. *Ardea herodias*. GREAT BLUE HERON.—Not abundant. This species is sometimes seen in the fall of the year, but its scarcity is quite natural since the cape is not at all suited to its wants. The individuals seen by me were either perched upon the fish-trap poles or else wading in the lake.

15. *Fulica americana*. AMERICAN COOT.—Very rare. Occasionally seen upon the lake in the fall of the year.

16. *Gallinago delicata*. WILSON'S SNIPE.—During the fall of the year this species is sometimes abundant and at other times rare. There is only a very small marsh upon the cape where they are to be found and which is hardly suited to the habits of the species.

17. *Numenius hudsonicus*. HUDSONIAN CURLEW.—Very rare. The cape being very rocky and densely wooded, it is no wonder that this bird is rare. The only two seen by me were shot on May 18, 1898, and both were females, found upon a grassy headland of about four acres in area. The stomachs of the birds contained a quantity of beetle-like insects.

18. *Dendragapus obscurus fuliginosus*. SOOTY GROUSE.—It would be hard to say whether this species is abundant or not owing to the character of the country. All that I can say, however, is that I have only seen one specimen, which I killed. This was on May 17, 1898, and upon dissection the specimen proved to be a female, her oviduct containing an egg upon which the coloring matter had not been deposited.

19. *Bonasa umbellus sabini*. OREGON RUFFED GROUSE.—Not abundant; although with a sufficient amount of labor these birds can be found. It took me nearly a month to become well enough acquainted with their habits to obtain even one or two a week.

These Grouse are only found upon the cape during the fall, and the utmost care must be exercised in hunting them. They are extremely fond of the small wild crab apples (*Pyrus rivularis*) which grow in the low, damp woods. The birds visit these trees very early in the morning and late in the evening, at which times they may be found silently perched upon the branches. As they generally hear you approaching before you discover them, they are nearly always seen in a motionless attitude, ready to fly at the slightest sound. It often happens that the first intimation a hunter has of the presence of a Grouse is a startling commotion among the branches overhead, the rapid whirl of wings and the bulky form of the bird as it hurls itself through the woods!

20. *Columba fasciata*. BAND-TAILED PIGEON.—This Pigeon is only seen on the cape when the salmon berries (*Rubus nutkanus*) ripen in June and July. They are then seen in large flocks, but are difficult to shoot

since they penetrate the densest woods in search of the berries. They also perch in the highest spruces and keep well out of range. I have been told that they also frequent the wheat fields in the vicinity of Ilwaco, Pacific Co., Wash.

21. *Falco columbarius suckleyi*. BLACK MERLIN.—Only one specimen of this Falcon was seen by me, and that was killed on April 23, 1898, and proved to be an adult female. Stomach contained portions of several small birds.

22. *Megascops asio kennicottii*. KENNICOTT'S SCREECH OWL.—Quite rare. Two specimens killed on June 30, 1898,—one, an adult female in the brown phase, and the other a female in the downy stage. The birds were found together in a dark ravine where the brood had probably been raised. The stomachs of both contained a quantity of grubs.

23. *Ceryle alcyon*. BELTED KINGFISHER.—The Belted Kingfisher arrived at the cape on March 23, 1898, and remained abundant all through the summer. They are never seen during the winter, but in summer can be found anywhere along the rocky shores of the bay. In all probability the species breeds upon the cape, as I have seen many disused tunnels in the clay banks. Before eating a fish I have seen the birds kill their prey by striking it against the limb upon which they were sitting.

24. *Dryobates villosus harrisii*. HARRIS'S WOODPECKER.—This Woodpecker is fairly abundant during the summer months; but it is a rather wild and wary bird, hard to shoot and harder to find afterwards in the thick brush of the fir woods which it inhabits. I have but two specimens in my collection. Both have the smoky under parts, and the dates of collecting were May 18 and June 5, respectively.

25. *Dryobates pubescens gairdnerii*. GAIRDNER'S WOODPECKER.—This small species of Woodpecker is fairly abundant during the fall and winter months, but becomes very scarce as spring merges into summer. Harris's Woodpecker now takes its place, so that the two species do not occur together upon the cape. When Gairdner's is common, Harris's is rare, and *vice versa*. Gairdner's Woodpecker may often be seen in small trees, such as alders, willows, etc., while its larger cousin is generally found in the dark fir woods, hammering upon the giant trunks. I did not find either species breeding.

26. *Melanerpes torquatus*. LEWIS'S WOODPECKER.—Very rare. Only one specimen seen by me during my entire stay upon the cape. This was killed by me on April 30, 1898, and proved to be an adult male in fine plumage. This individual was remarkably tame and was seen perched in the top of a low fir tree directly in front of the house, where it would sit for a few minutes and then fly into the air after an insect, very much in the same manner as a Flycatcher.

27. *Colaptes cafer saturation*. NORTHWESTERN FLICKER.—The Northwestern Flicker is fairly abundant during the entire year, but especially so in the fall and spring. I think it is a wilder and more wary bird than

its southern representative, *Colaptes cafer*, and its note is louder and more ringing. Although I have never found its nest, in all probability the species breeds upon the cape, since I have found many deserted holes. These were generally placed in rotten tree trunks from fifteen to thirty feet above the ground.

28. *Trochilus rufus*. RUFOUS HUMMINGBIRD. — This species is one of the most abundant birds found upon the cape. The cape swarms with them from the first part of March until September. They nest very early — about April 20 or 25, you may look for eggs. The majority of the nests are placed in thick fir trees and are built directly upon a horizontal bough, the needles of which often penetrate the bottom of the nest. This seems to be the only defect in the most perfect and beautiful of bird structures! It is, however, not such a common condition as I may have led you to suppose. About one nest in six or eight is thus defective.

29. *Sayornis saya*. SAY'S PHÆBE. — During my stay upon the cape I saw but one specimen of this species, which I shot on June 1, 1898. It was an adult male and I quote the following lines from my notes concerning this individual. "I found this bird upon the ocean beach among the drift wood. It was extremely wild and wary and would keep just out of range, flying from log to log as I approached. I was finally able to kill it by crawling on my hands and knees to a big log which concealed me." The cape is an ideal place for *Contopus borealis*, but a very poor one for this species.

30. *Contopus borealis*. OLIVE-SIDED FLYCATCHER. — This species is most abundant throughout the summer. That is abundant for a bird as comparatively rare as is the Olive-sided Flycatcher. They arrive very early in May, the males preceding the females about one month, and remain until late summer or fall. During the month of May, 1898, I killed fifteen specimens and saw twice as many more, which is good proof of their abundance. Although plentiful they are rather difficult to shoot, their favorite perches being the tallest pines and spruces. Their penetrating notes resound through the dark fir woods during the long days of summer, being the only sound which breaks a death-like silence. The notes, which are whistled shrilly, are something like this: *Whe-whe-whea*, uttered rather quickly and repeated twice. After repeating these notes four or five times, they whistle *whet-we-wea*, an interval being between the first and the last two, which are sounded close together.

In all probability this Flycatcher breeds upon the cape, but their nests are next to impossible to find.

31. *Contopus richardsoni*. WESTERN WOOD PEWEE. — Not so abundant as the last, but often seen associated with it and catching insects in the same tree. This species arrives soon after *Contopus borealis*, and remains about the same length of time. Probably breeds on the cape.

32. *Cyanocitta stelleri*. STELLER'S JAY. — This Jay is very abundant in the fall and spring, but exceedingly scarce in winter, only one pair remaining on the cape through the winter of 1897-98. During the fall I

once counted twenty-five of these Jays all in sight at one time. Although rather tame they possess a remarkable amount of sagacity and well know when they are being hunted. They are very noisy birds and may often be seen mounting a giant spruce tree, limb by limb, ascending spirally about the trunk until the topmost branch is reached. They often do this when being pursued, and since they seldom pause until the top is reached, it takes a quick shot to bring one down.

Although the birds from Cape Disappointment are without doubt Steller's Jays, Mr. Leverett M. Loomis of the California Academy of Sciences pronounced them to be an intermediate form and not as typical *Cyanocitta stelleri* as is the Alaskan form.

The species is one of the most characteristic and interesting found upon the cape and may possibly nest there.

33. *Corvus americanus*. AMERICAN CROW. — Quite abundant during the entire year. But I hardly think that it is as abundant as *Corvus caurinus*, which is a very common bird on the cape. *Corvus americanus* associates with *C. caurinus* in large flocks, and probably breeds upon the cape.

34. *Corvus caurinus*. NORTHWEST CROW. — This Fish Crow is abundant on the cape during the entire year, and is generally to be found in large flocks, inhabiting the wooded shores of the bay. The birds are very maritime in their habits and feed principally upon the beaches, where they pick up shellfish, crabs and refuse washed up by the waves. After being once shot at they become exceedingly wild and wary and difficult to approach. They nest upon the cape in spruces.

35. *Agelaius phoeniceus*. RED-WINGED BLACKBIRD. — Not abundant. This species, together with the next, arrives about March 1 and remains throughout the summer. These birds are rather hostile towards their western representative, the Bicolored Blackbird, and frequently drive the latter from the small marsh which they are both forced to inhabit. Some of the specimens shot by me are typical of the species. Although I found no nests, they doubtless breed upon the cape.

36. *Agelaius gubernator californicus*. BICOLORED BLACKBIRD. — More abundant than the preceding, with which it is closely associated; the same remarks applying to both.

37. *Carpodacus purpureus californicus*. CALIFORNIA PURPLE FINCH. — These beautiful Finches arrive at the cape early in March and remain abundant throughout the summer. They breed upon the cape, and one of the finest nests in my collection was built by this Finch entirely of straight fir twigs, which causes it to be rather triangular in form. It is lined with horsehair.

38. *Spinus tristis*. AMERICAN GOLDFINCH. — In 1898 these Goldfinches arrived at the cape on April 25, and in a few weeks became quite abundant. They breed upon the cape and depart in early fall. Their nests may be looked for in May and June and are generally built in deciduous trees, in most cases being placed in a fork. However, I observed

one nest which was placed upon the drooping branch of a fir tree. The sprightly ways and twittering song of this beautiful bird are so well known that I will forbear further description of its habits.

39. *Ammodramus sandwichensis*. SANDWICH SPARROW.—I observed this species for the first time upon the cape on April 20, 1898, when a small flock was seen on the grassy headland where I had previously shot the Hudsonian Curlew. This headland is the only spot on the entire cape at all suited to the habits of ground birds.

The Sandwich Sparrows, however, remained upon it until the middle of May when they suddenly disappeared. Doubtless the flock was on its northward migration and must be considered as an unusual occurrence on the cape. Dr. Coues very kindly examined a specimen for me from this flock and pronounced it typical of the species. After being hunted a short time the birds became very wild and would flush from the grass quite out of range. They have often led me into dangerous places by flying down the sides of the headland and alighting in the stunted grass which grows upon the rocky sides only a short distance above the breakers. They seemed to know that by going into such places they stood a better chance of escaping.

40. *Zonotrichia gambeli*. GAMBEL'S SPARROW.—This species arrives on Cape Disappointment about the middle of April and remains rather scarce throughout the season. I think the cape is too heavily wooded for it to become abundant. I discovered the birds breeding in the summer of 1897 upon the windy headlands, their nests being placed deep in the hearts of thick spruces to protect them from the strong winds.

I have often seen this handsome Sparrow perched upon the top of a young spruce, its plaintive song rising above the roar of the ocean while the wind almost blew it from its swaying perch.

41. *Zonotrichia coronata*. GOLDEN-CROWNED SPARROW.—This species arrives with *Zonotrichia gambeli* but is rather less abundant and does not nest upon the cape. The birds are extremely fat and the most difficult to skin of any Sparrows I have ever prepared. These birds seem to be more at home in the woods than Gambel's Sparrow.

42. *Junco hyemalis oregonus*. OREGON JUNCO.—Abundant throughout the year with the exception of summer, when it is not seen upon the cape. A large flock of these birds inhabited a manure field during the whole winter of 1897-98. They leave the cape in early summer.

43. *Melospiza fasciata guttata*. RUSTY SONG SPARROW. The Rusty or Oregon Song Sparrow is a most abundant bird upon the cape at all seasons of the year, and their cheerful songs help very much to cheer the rainy winters. The birds inhabit the thick underbrush in countless numbers and may be readily called out by chirping. They breed upon the cape, but their nests are most difficult to find. The following is a description of one taken on July 1: "The nest was situated on the horizontal branch of a small spruce tree about five feet from the ground. It is composed entirely of very coarse grass stems and is lined with fine

grass. The parent bird could seldom be seen upon the nest owing to its extreme wariness. In fact I never once succeeded in approaching near enough to the nest to see the bird as she sat upon it. I was only able to accomplish this by waiting in a thick clump of brush which concealed me, until she returned to the nest. This nest measured as follows: Diameter outside, 5 in.; diameter inside, 3 in.; depth outside, $3\frac{1}{2}$ in.; depth inside, 2 in.

44. *Passerella iliaca unalaschcensis*. TOWNSEND'S SPARROW. — This large Sparrow is found on the cape during the entire year with the exception of summer. They are rather less abundant than the Rusty Song Sparrows and are more retiring in their habits. They are much oftener heard scratching in the brush than seen and are difficult to shoot for that reason.

45. *Pipilo maculatus oregonus*. OREGON TOWHEE. — For some unaccountable reason this bird is extremely rare upon the cape. During my entire stay I killed but one specimen. This was a female killed on March 5, 1898. Being a brush inhabiting bird it is possible that they do occur upon the cape; but it must be said that they are extremely rare and would certainly have been discovered by me if at all plentiful.

46. *Hirundo erythrogaster*. BARN SWALLOW. — This Swallow arrives very early in April and remains very abundant throughout the summer, adding very much to the natural beauty of the cape. Since they are not disturbed the birds become very tame and nearly every house in the garrison has its Swallow's nest over the front porch. These are generally placed in a corner or on a projecting cornice or post top.

47. *Tachycineta bicolor*. TREE SWALLOW. — Rare. In 1898 a few of these birds were seen in May. Shot one specimen.

48. *Clivicola riparia*. BANK SWALLOW. Very rare. In May, 1897, while searching the island near the end of the cape I found a nest of this species containing a full set of eggs. This is the only time I met with the species upon the cape.

49. *Petrochelidon lunifrons*. CLIFF SWALLOW. — Quite a number of these birds were seen in the summer of 1898 and one was shot and identified. I also observed many Swallows nesting in the caves on the ocean side of the cape which were probably referable to this species. It was impossible to identify them, since the caves were almost pitch dark, and the birds mounted high in air as soon as they left them.

50. *Ampelis cedrorum*. CEDAR WAXWING. — Rare. Three of these handsome birds were seen upon the cape in the middle of June, 1898, and one pair remained to build their nest. This is the only time they were seen upon the cape.

51. *Helminthophila celata lutescens*. LUTESCENT WARBLER. — This is one of the first Warblers to arrive, early in April, and it remains one of the most abundant birds throughout the summer. On April 29, 1898, I found a nest of this species containing five fresh eggs, and situated in a small cavity in a grassy bank. The cavity was only a slight hollow

formed by an overhanging clump of fern and was an ideal spot for a bird's home. All the nests found by me (five or six) were thus placed in green banks.

52. *Dendroica auduboni*. AUDUBON'S WARBLER.—Abundant throughout the summer and nests upon the cape. A nest taken by me on June 27, 1898, was placed on the horizontal bough of a spruce tree forty feet from the ground, and six feet from the trunk of the tree. The nest could only be seen from above and was discovered by seeing the parents build it.

53. *Wilsonia pusilla pileolata*. PILEOLATED WARBLER.—Fairly abundant in summer but not nearly so plentiful as the two preceding species. I found a nest of this Warbler on June 15, 1898, which was placed in the center of a large clump of fern growing in some low damp woods. It contained three young birds and one addled egg, and was quite bulky, being $6\frac{1}{2}$ inches in outside diameter and $4\frac{1}{2}$ inches in outside depth.

54. *Thryomanes bewickii spilurus*. VIGORS'S WREN.—This Wren is exceedingly rare upon the cape. One male specimen was killed by me on May 26, 1898,—the only one ever seen.

55. *Anorthura hiemalis pacificus*. WESTERN WINTER WREN.—A common resident of the cape and seen at all seasons of the year. It is, however, a very retiring bird and is not often shot. Nests upon the cape and is a good songster.

56. *Parus atricapillus occidentalis*. OREGON CHICKADEE.—This sprightly little bird is abundant during the winter but very rare in summer. I find nothing in my notes concerning it.

57. *Parus rufescens*. CHESTNUT-BACKED CHICKADEE.—Quite abundant during the entire year but especially so in winter. The birds nest upon the cape and I found one on May 20, 1898, built in a hollow twenty-one feet from the ground and containing seven eggs. For a complete description of this nest, see 'Bulletin Cooper Ornithological Club,' Vol. I, No. 5, pp. 84-85.

58. *Regulus satrapa olivaceus*. WESTERN GOLDEN-CROWNED KINGLET.—This species is abundant throughout the winter but does not occur upon the cape at any other season.

59. *Regulus calendula*. RUBY-CROWNED KINGLET.—This species associates with the last and is also frequently seen with *Parus rufescens*. They are abundant birds throughout the winter.

60. *Hylocichla ustulatus*. RUSSET-BACKED THRUSH.—These Thrushes do not arrive on the cape until April or May, when they become exceedingly abundant, their low whistle being heard on all sides. Their nests may be found by the hundreds in the low damp woods and are nearly always placed in alders. The first nest found in 1898 was on June 14.

61. *Merula migratoria propinqua*. WESTERN ROBIN.—These birds are only absent from the cape during the height of the rainy season—

December, January and February. At all other seasons they are most abundant and their nests are very plentiful.

62. *Hesperocichla naevia*. VARIED THRUSH. — The Varied Thrush or Oregon Robin is a very common bird during the winter, but departs to its breeding grounds with the advent of spring. In habits it is much like the common Robin.

63. *Sialia mexicana*. WESTERN BLUEBIRD. — Very rare. Only one specimen of this bird was ever seen by me upon the cape. This was an immature female killed April 5, 1898.

In conclusion I wish to state that I have attempted to describe the bird life of the cape just as I saw it, and for the purpose of relieving the monotony of mere dates have included some of the most prominent habits of the birds as seen by me. I also wish to say that there were some birds not identified by me, which occur upon the cape, such as the larger Hawks and Eagles, and also the shore birds, which are entirely absent from the list for want of proper identification. All specimens in my collection whose identification was uncertain were compared with specimens in the collection of the California Academy of Sciences, and Mr. Loomis also very kindly examined certain birds for me.

NESTING HABITS OF THE CERULEAN WARBLER.

BY W. E. SAUNDERS.

SOME years ago, while on a short walking trip through the western peninsula of Ontario, I located a woods in which the Cerulean Warbler (*Dendroica cerulea*) was exceedingly common. Ever since, I have wished for an opportunity to visit that locality in early May that I might make their acquaintance in the house-keeping season and perhaps get a few nests. Near London, only 60 or 70 miles farther east, they average uncommon; and near Toronto they are seldom seen.

On May 16, 1900, I got back near the place and in a day's hunt succeeded in finding two pieces of woodland where they were common, and though there appeared to be as yet no sign of nest

building, the prospects were so favorable that I determined to visit the place again at a later date. In the meantime I found a pair near London, and after a short watch saw the female at work on the nest, which was then just begun, and could hardly be seen from the ground for leaves, though only seventeen feet up on a sloping limb of a basswood. By the 24th it was apparently finished but no bird was near, nor were they to be seen on the 28th, and on June 2nd, when the ascent was made, the nest was found completed but empty. It was situated on a limb two and one half inches in diameter just beside a vertical twig, but not held in place by anything except its own fibres attaching it to the main branch.

On June 4, accompanied by Mr. H. Gould, I made the western trip again, and after walking the necessary seven miles that evening we set the alarm clock for before daylight and turned in. Next morning we were in the woods long before five, and found, as before, many Ceruleans in full song, and immediately set to work, thinking we had easy work before us. But when, after two or three hours of steady work we met, and found that the total result was one nest building, we began to fear, and by ten o'clock were ready to give up.

We then spent an hour or two in another woods, but came back to lunch on the scene of our disappointment, and while eating we noticed a female, leisurely feeding and hopping around in a tree in front of us. By the time we were ready to move, she had covered two or three trees so often that we felt sure her nest was in one of them and we got on opposite sides of the clump of trees to watch her. Then it began to dawn on us why we had met with so little success in the morning, for it kept us both busy to keep track of the little greenish bird traveling high up among the green leaves. However, after a half hour or so she disappeared in a place where one watcher would not have been able to guess at her whereabouts, but to the other, she was easy, and two steps to one side revealed the nest. A climb of forty-five feet in a leaning basswood reached the nest, which contained one egg only, but as we were not very sanguine of finding more we took it.

We then decided to hunt together, and the difficulty was solved.

We soon located a male, singing and preening himself, and one sat down to watch while the other hunted within call. In ten or fifteen minutes he ceased preening and began to feed, and then, as before, it kept two pairs of eyes and two B. & L. Stereo glasses exceedingly busy to follow him. Presently he darted out and gave chase to another bird who proved to be his mate, and immediately we quit watching the male and followed the female. In less than five minutes she ceased feeding and flew sixty yards, straight to the nest, in full view on a bare limb of basswood fifty feet from the ground and six feet out from the trunk. This nest is supported by one small twig which passes through one corner of it; but it is for the most part saddled on the limb just as the Blue-gray Gnatcatcher's or the Ruby-throated Hummingbird's often are. It measures outside two inches high and three inches wide; inside $1\frac{5}{8}$ deep by $1\frac{7}{8}$ wide. The supporting limb is one inch in diameter just below the nest, which is mainly composed of grasses and a few bark fibres, with a scanty lining of black horsehairs in the bottom and on one side, the other side being less heavily built and lacking the lining. The whole is covered with the same silvery-gray bark strips that the Redstart uses so freely, with some intermingling of cobwebs, both barkstrips and cobwebs having the appearance of being put on while wet. Incubation was half finished, and the four eggs measure, by average, $.67 \times .52$ in., the extremes being $.68 \times .52$ and $.66 \times .51$. The ground color is bluish white and is very thinly covered with small spots of light brown and purplish, but around the large end is a fairly heavy circle of the same.

By this time we found the problem solved, and by hunting together we found the nest of almost every male we started to watch and of every female we saw. The next one had to be watched only a short time before his mate was found and we watched her for some time building a nest about thirty feet up in a tall, slim maple, the nest being against the trunk, and apparently semi-pensile. This was a peculiarity far from their usual method, but as we did not wish to disturb them, in the hope that we would return again, we left it. Unfortunately this hope was not realized.

We then walked along for some minutes without finding a

male in a favorable location, those we saw being in the tops of very tall elms, where it was impossible to watch them well, and where we could not have got the nest even if we found it. Strolling along, however, one of us suddenly saw a female and watched her to the nest before the other got a glimpse of her at all. This nest was in a sloping basswood, forty feet from the ground and four or five feet from the trunk, on a heavy ascending limb which measures one and three fourths inches in diameter just below the nest, which is built at the offsetting of a seven eighth inch branch, beside which are two small twigs whose leaves sheltered the nest from above. It measures $1\frac{3}{4}$ inches high on the outside and $2\frac{3}{4}$ wide; inside it is 1 inch deep by $1\frac{7}{8}$ wide. The composition of the nest is identical with the one already described, except that the lining, which was entirely black in the other, is in this one red and is made of red cowhairs, red rootlets and a very few white horsehairs. Incubation was one half completed, and the four eggs measure by average, $.66 \times .53$ inches, the extremes being, $.65 \times .53$ and $.69 \times .53$. The coloring is similar to that of those already described with a few spots of darker brown in the ring. This nest contained a Cowbird's egg also, and the five eggs filled the shallow nest exceedingly full.

We soon located another male, and found his mate within ten minutes and the nest shortly after. This was in an oak, and only twenty-three feet from the ground. The nest contained four eggs of the usual ground color, many of the spots being large and of a lighter brown color. Incubation was so far advanced that it was found impossible to make good specimens of them. This ended the day, which had yielded us three sets of four, one nest with one egg, and two nests building.

At London, on June 11, the nest just commenced on June 3 was found to be covered by the female; and on June 16 it was taken. It was in a maple thirty-five feet from the ground, and six feet out on an ascending limb. Sitting at work just below the nest-limb I found the trunk of the tree, on a level with my eyes, was two inches in diameter, which gave no chance to work from above the nest. However, by the use of a long-range tree pruner, and very careful work, I managed to get the limb safely off and drew it in. The nest was situated on a horizontal branch just

after its separation from the parent limb, which was one and one fourth inches in diameter before the crotch. It is composed of grass and weed stems and a few bark strips and lacks the hair lining entirely, being sparsely lined with some small, red-brown fruit stems. On the outside there is very little of the silvery covering of the others, but a small twig, encircling the nest for half its circumference and thoroughly well bound into it, gives it a far greater air of substantiality than have the others. The leaves of this twig and its branchlets so completely hid the nest from view that there were but two points from which it could be seen at all well. It measures $1\frac{3}{4}$ inches high by $2\frac{3}{4}$ wide outside, and on the inside $\frac{7}{8}$ by $1\frac{3}{4}$ wide. It contained five eggs, one of them a Cowbird's. They appear larger than the other sets, possibly on account of their ground color being creamy white instead of bluish white; but the average measurement of $.67 \times .53$ shows the difference to be trifling. The largest egg is $.67 \times .54$ and the smallest $.66 \times .53$. They are spotted more regularly than the others, over the whole surface, but yet have a well-marked ring. The spots are of a lighter brown with a sprinkling of lilac and the eggs closely resemble some sets of the Redstart, while the former sets bore a greater resemblance to the eggs of the Yellow Warbler, only that the spots are more brownish than in that species.

A feature that interested me very much was the extreme shallowness of the nests; all the other Warblers with which I am acquainted building a comparatively deep nest, and the query arises, Does the bird build a shallow nest because it places it on a substantial limb, or does it place it on a substantial limb because its nests are shallow? The attachment of the nest, also, is exceedingly frail, and I am inclined to think that few of these nests would remain in position long after the young had left. Of the eight nests found this year, two were in oaks, two in maples, and four in basswoods, showing a marked leaning toward the latter tree. The only other nest found near London was noted by Mr. Robert Elliott of Brymston in 1899, in an elm, about fifty-five feet from the ground and ten feet out from the trunk, where such a prudent climber as I am, had no desire to take it.

NORTH AMERICAN BIRDS COLLECTED AT SANTA MARTA, COLOMBIA.

BY J. A. ALLEN.

IN A collection of about 3000 birds made for the American Museum of Natural History in the Santa Marta district of Colombia, under the direction of Mr. Herbert H. Smith, during the period from May 4, 1898, to September 7, 1899, are many species of North American migrants, quite a number of which have not been previously recorded from this portion of South America. Although a report on the collection as a whole has recently been published,¹ it may interest many readers of 'The Auk' who are not likely to see this report, to have placed before them a list of the North American species, with the dates and places of capture.

Credit should be given in this connection to Mrs. Herbert H. Smith, already so well known as an experienced ornithological collector in various parts of tropical America, for the formation of this valuable collection. The localities at which the following list of North American species was obtained are nearly all in the low coast region near the town of Santa Marta. The list embraces only North American migrants, and does not include such North American species as are also resident and breeding birds in Colombia. Those marked with an asterisk (*) were not previously recorded from the Santa Marta district of Colombia. Cienaga, where most of the shore birds were taken, is on the coast, about twenty miles south of Santa Marta. This is apparently the only point on the seashore where collecting was done, and only about a week was spent at this point. No thorough collecting for water birds on any part of this portion of the Colombian coast has thus far been done.

¹ List of Birds collected in the District of Santa Marta, Colombia, by Mr. Herbert H. Smith. By J. A. Allen. Bull. Am. Mus. Nat. Hist., Vol. XIII, pp. 117-183. August 25, 1900. An annotated list of 388 species.

1. **Butorides virescens*. GREEN HERON.—A single specimen was taken at Bonda, near Santa Marta, in October, 1898. There is also one record for Venezuela (Lake Valencia, Sclater and Salvin, P. Z. S. 1869, 250).

2. **Tryngites subruficollis*. WHITE-RUMPED SANDPIPER.—Cienaga, Sept. 12 and 17, 1898. Ranges south to Paraguay.

3. **Bartramia longicauda*. BARTRAMIAN SANDPIPER.—A single specimen was taken at Cienaga, Sept. 15, 1898. Ranges south to southern Brazil, Uruguay, and northern Argentina.

4. *Actitis macularia*. SPOTTED SANDPIPER.—Several specimens were taken at Cienaga, Sept. 13 and 14, 1898. Previously recorded from La Concepcion, March 23, 1889, by Mr. Bangs (Proc. Biol. Soc. Wash., XIII, 1899, 92). Ranges south to southern Brazil.

5. *Totanus solitarius*. SOLITARY SANDPIPER.—Three specimens were taken at Cienaga, Sept. 10-12, 1898. Previously recorded from Santa Marta (Dec. 16, 1878) by Salvin and Godman (Ibis, 1880, 178).

6. **Totanus flavipes*. YELLOW-LEGS.—One specimen, Cienaga, Sept. 12, 1898. As is well known, this species ranges south to Patagonia.

7. **Micropalama himantopus*. STILT SANDPIPER.—A single specimen was taken at Cienaga, Sept. 12. Has been recorded from Uruguay, Peru, and Chili.

8. **Tringa maculata*. PECTORAL SANDPIPER.—One specimen, Cienaga, Sept. 14. Ranges south to Patagonia.

9. **Tringa minutilla*. LEAST SANDPIPER.—A series of eight specimens was taken at Cienaga, Sept. 10-14. Apparently common. There are various records for eastern Brazil; Pernambuco appears to be its most southern record.

10. **Ereunetes pusillus*. SEMIPALMATED SANDPIPER.—Two specimens were taken at Cienaga, Sept. 12.

11. *Buteo latissimus*. BROAD-WINGED HAWK.—This is apparently an abundant winter resident in this region. The dates for the seven specimens collected are Bonda, from Nov. 13, 1898, to March 26, 1899, and Valparaiso (alt. 5000 ft.), March 21. Salvin and Godman (Ibis, 1880, 177) and Bangs (Proc. Biol. Soc. Wash., XII, 1898, 132) have, respectively, recorded it from Minca (Jan. 17 and 22), and Santa Marta (winter).

12. **Coccyzus americanus*. YELLOW-BILLED CUCKOO.—Nine specimens were collected at Bonda, Oct. 27 to Nov. 21, 1898. Ranges south to southern Brazil and northern Argentina.

13. *Tyrannus tyrannus*. KINGBIRD.—Not represented in the Smith Collection, but recorded from Santa Marta (April 4) by Salvin and Godman (Ibis, 1880, 125). Has also been recorded from as far south as the Upper Amazon and Bolivia.

14. *Myiarchus cineritus*. CRESTED FLYCATCHER.—Five specimens were taken at Bonda, at various dates from Nov. 22 to Feb. 27. Previously recorded from Santa Marta, by Bangs (*l. c.*, XII, 137). This is nearly the southern limit of its known range, a single specimen having

been recorded from Bucaramanga, Colombia, about 400 miles south of Santa Marta, by Count von Berlepsch (J. f. O., 1884, 303).

15. *Nuttallornis borealis*. OLIVE-SIDED FLYCATCHER. — A single specimen was taken at San Lorenzo (alt. 7500 ft.), May 13, 1899. Previously recorded from Minca (March 13) by Salvin and Godman (Ibis, 1880, 125), and from La Concepcion (March 8) by Bangs (*I. c.*, XIII, 98). It has not been recorded from south of Bogota, Colombia.

16. *Contopus virens*. WOOD PEWEE. — A specimen was taken at Valparaiso, April 19, and another at Cacagualito, May 10 — a very late record for so far south. It was previously recorded from Santa Marta — a single specimen, April 5 — by Godman and Salvin (Ibis, 1880, 125). Bogota, Colombia, seems to form its present known southern limit.

17. *Empidonax virescens*. GREEN-CRESTED FLYCATCHER. — The four specimens taken were obtained at Bonda, Nov. 16, Onaca, Dec. 28 and Jan. 21, and Valparaiso, March 21. There is a previous winter record for the species for Santa Marta (Bangs, *I. c.*, XII, 137), these forming its only Colombian records. It has, however, been recorded from western Ecuador.

18. *Icterus galbula*. BALTIMORE ORIOLE. — Although this species is not represented in the Smith Collection, it has been twice recorded from the Santa Marta district — from Minca, Feb. 12, 1879, by Salvin and Godman (Ibis, 1880, 123), and from Santa Marta (winter) by Bangs (*I. c.*, XII, 139). These are the most southern records for the species.

19. * *Dolichonyx oryzivorus*. BOBOLINK. — A specimen was taken at Cienaga, Sept. 12, and another at Bonda, Oct. 12 — the only Colombian records, although it has a wide winter distribution in South America, extending to Bolivia and the southern border of Brazil.

20. *Spiza americana*. DICKCISSEL. — Four specimens were taken at Bonda, Jan. 4 and 5, and Mar. 21. It is also recorded by Bangs (*I. c.*, XII, 140) from Santa Marta. It has been also reported from other parts of Colombia, and from Venezuela and Guiana.

21. *Zamelodia ludoviciana*. ROSE-BREASTED GROSBEAK. — This species was taken at Masinga Veija, Nov. 23, and at Valparaiso, March 29. Previously recorded from Minca (Jan. 29) by Salvin and Godman (Ibis, 1880, 122), and by Bangs (*I. c.*, XII, 140) from Santa Marta. It has a wide winter range in northern South America, specimens having been recorded from western Colombia and central Ecuador.

22. *Piranga rubra*. SUMMER TANAGER. — Apparently a common winter visitant, the Smith Collection containing thirty-three specimens, taken mostly at Bonda, and at various dates from Nov. 8 to March 17. It has been previously reported from the region by Salvin and Godman (Ibis, 1879, 200, and 1880, 121) and Bangs (*I. c.*, XII, 141). Some of the males taken in November were in the fully adult red plumage; others taken in December and January were moulting into the red dress, while a number of young males taken in these months showed no trace of moulting. The known winter range of the species extends to Peru and Bolivia.

23. *Vireo flavifrons*. YELLOW-THROATED VIREO. A single specimen was taken at Onaca, Dec. 28. A single specimen has also been recorded from Minca (Feb. 13), by Salvin and Godman (Ibis, 1880, 118). This species appears to rarely pass south of the West Indies and Central America.

24. *Vireo olivaceus*. RED-EYED VIREO.—This is an apparently rare visitor to northern South America. It is not contained in the Smith Collection, but has been recorded from Santa Marta, April 3, by Salvin and Godman (Ibis, 1880, 118). It has also been recorded from southern Brazil (Allen, Bull. Am. Mus. Nat. Hist., III, 346), and from Bucaramanga by Count von Berlepsch (J. f. O., 1884, 285).

25. *Setophaga ruticilla*. REDSTART.—This abundant winter visitor to the northern border of South America is represented by a series of fourteen specimens, taken at Bonda from Sept. 2 to Jan. 10, and at Valparaiso from March 11 to 30.

26. *Geothlypis philadelphia*. MOURNING WARBLER.—Mr. Bangs records (*I. c.*, XIII, 105) a series of ten specimens of this species from Chirua and La Concepcion, taken Feb. 12 to March 25.

27. **Geothlypis agilis*. CONNECTICUT WARBLER.—A single specimen was taken at Bonda, Oct. 22. This, so far as I am aware, is the second winter record for this species, Count von Berlepsch (J. f. O., 1889, 90) having recorded a single specimen from Tonantins, Brazil, on the middle Amazon, taken April 9, 1884.

28. *Geothlypis formosa*. KENTUCKY WARBLER.—Five specimens were taken at Bonda, Oct. 7 to Nov. 24, and Mr. Bangs (*I. c.*, XII, 144) has recorded a single specimen from Santa Marta. These appear to be the first records for the species south of Cuba and Central America.

29. *Seiurus noveboracensis*. WATER-THRUSH.—This species was taken at Bonda at various dates from Sept. 8 to Nov. 5, and at Cienaga, Sept. 14. It has been previously recorded from this district by Salvin and Godman (Ibis, 1880, 117), and by Bangs (*I. c.*, XIII, 105), the dates being Feb. 7 and March 17. Mr. Bangs has also recorded (*I. c.*) a single specimen he refers to *Seiurus noveboracensis notabilis*, taken at Chirua, Feb. 7.

30. *Seiurus motacilla*. LOUISIANA WATER-THRUSH. A single specimen was taken at Bonda, Nov. 8, and Mr. Bangs has recorded (*I. c.*, XII, 143) another example from Santa Marta. These are the first records for the species known to me from northern South America.

31. *Dendroica aestiva*. YELLOW WARBLER.—An abundant winter resident. It was collected at Bonda as early as August 27, and at later dates at the same place till Jan. 31. There are various previous records for Colombia and Ecuador.

32. **Dendroica striata*. BLACK-POLL WARBLER.—A series of thirty-one specimens was taken at Bonda, all collected Oct. 7 to Nov. 22, indicating its great abundance during that particular period. There are previous records for Bogota and various other localities in northern South America.

33. **Dendroica castanea*. BAY-BREASTED WARBLER. — A single young male was taken at Bonda, Oct. 27. It had been previously taken at a few other points in central and western Colombia.

34. **Dendroica caerulescens*. BLACK-THROATED BLUE WARBLER. — An adult male was taken at Las Nubes, Dec. 16 — apparently the first South American record for the species.

35. **Dendroica blackburniæ*. BLACKBURNIAN WARBLER. — Six specimens were collected at Las Nubes and Valparaiso, Dec. 10–13, and March 24–29. The species is a rather common winter migrant to northern South America (south to central Peru), though not previously recorded from the Santa Marta region.

36. *Helminthophila peregrina*. TENNESSEE WARBLER. — The dates for the eleven specimens of this species extend from Nov. 3 to April 4. It is a well known winter migrant to northern South America — Venezuela, Colombia, and Ecuador.

37. *Helminthophila chrysoptera*. GOLDEN-WINGED WARBLER. — This species was taken at Bonda, Sept. 6 and Oct. 3, and at Las Nubes, Dec. 7. Recorded from Minca, Feb. 8, by Salvin and Godman (*Ibis*, 1880, 117), and from Pueblo Viejo, March 20, by Bangs (*I. c.*, 1898, 160).

38. *Helminthophila pinus*. BLUE-WINGED WARBLER. — Mr. Bangs reports (*I. c.*, XIII, 105) the capture of a single specimen at Chirua, March 21 — the first Colombian, and apparently the first South American, record for the species.

39. *Protonotaria citrea*. PROTHONOTARY WARBLER. — A series of thirty-seven specimens, all from Bonda, and collected Oct. 8 to Jan. 30, indicates that this is a locally abundant winter visitor. Mr. Bangs (*I. c.*, XII, 143) has recorded it from Santa Marta, and there are previous records for other parts of Colombia and Venezuela.

40. *Mniotilta varia*. BLACK AND WHITE WARBLER. — Taken at Bonda as early as August 21, and at Onaca as late as Jan. 4. Salvin and Godman record (*Ibis*, 1880, 117) it as taken at Minca Jan. 14 and 17. It is a well known migrant to Colombia and Venezuela.

41. **Hylocichla fuscescens*. WILSON'S THRUSH. — Three specimens were taken at Bonda, Oct. 5, 7, and 13. Its winter range is well known to extend to southern Brazil.

42. *Hylocichla ustulata swainsoni*. OLIVE-BACKED THRUSH. — Taken at Bonda Nov. 5 and in January. Previously recorded for this region by Salvin and Godman (*Ibis*, 1880, 115) and by Bangs (*I. c.*, XIII, 107), a single specimen from Chirua Feb. 16. It has also been collected at Bucaramanga, and at several points in Ecuador, and in central Peru.

43. *Hylocichla aliciæ*. GRAY-CHEEKED THRUSH. — This species is represented by a series of sixteen specimens, collected at Bonda, Onaca, Las Nubes, and Valparaiso, from Oct. 7 to April 7, showing it to be a common winter visitor, arriving early and departing late. Mr. Bangs has also recorded (*I. c.*, XII, 144) it from Santa Marta. It has also been taken at Bucaramanga and Bogota, and in Ecuador and eastern Peru.

THE MOULT OF THE NORTH AMERICAN SHORE
BIRDS (LIMICOLÆ).

BY DR. JONATHAN DWIGHT, JR.

THE Limicolæ of North America constitute a large group of closely related species which also greatly resemble each other in their successive plumages and moults. Probably the best known of them are the Sandpipers, Yellow-legs, Curlews, Plovers, and others included under the popular name of 'Bay-snipé' which frequent our seashores, although the Woodcock and the Snipe may be more familiar acquaintances to the average sportsman. They are all birds of strong flight, and the bulk of them, breeding in Arctic regions, push southward in flocks in the autumn and again northward in the spring. In their migration many of them cross the equator in both hemispheres, some even reaching Patagonia and South Africa. As a result of this long line of migration, in some species, thousands of miles in length, they appear to tarry but for a brief period on the journey, so that in most cases we know little of their plumages other than their migration dress, and still less of the moults by which changes are effected. In fact, so little has been known that belief in extensive color changes in old feathers, especially in cosmopolitan species, has prevailed, although such belief now proves to be groundless because contrary to facts which, it may be said, are none too well known. The reasons are not far to seek. There is a great scarcity in collections of birds which show actual moult, and there is an even greater scarcity of adults in winter plumage, so it has escaped notice that young birds and old, after a certain period in the fall, are practically indistinguishable, and, what is more, males and females assume an almost identical plumage. This sometimes renders difficult an explanation of the midwinter moult which takes place, apparently in all species. It is undoubtedly complete, to the flight-feathers and tails in most young birds, and apparently is confined to the body-feathers in adults, although it is possible that some species undergo a complete moult in adults as well as young.

Such evidence as I have been able to gather is derived from specimens in my own collection where age and sex have been determined by dissection, and from large series of skins in the American Museum of Natural History and the U. S. National Museum, which have been kindly placed at my disposal by the respective curators, Dr. J. A. Allen and Prof. Robert Ridgway. Of a few species I have examined birds taken almost every month in the year, but every attempt to link together the successive plumages is much like trying to read a book from which stray pages have been torn. However, I find that what is true of Passerine birds and of the Grouse is equally true of the Shore Birds, viz., that *Every species has a definite sequence of plumages and of moults, the plumages being modified by wear and changed by moult.*

This principle of sequence of plumages, which I have explained at length in previous papers, is illustrated by a scheme of plumages and moults which was originally laid out for Passerine species (Annals N. Y. Acad. Sci., XIII, 1900, p. 104) but it is equally applicable to the Shore Birds. It shows the plumages in their natural sequence followed by the moults that occur, unless suppressed, as they are in some species, and it is as follows:

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| 1. Natal Down. | 1. Postnatal Molt. |
| 2. Juvenal Plumage. | 2. Postjuvenal Molt. |
| 3. First Winter Plumage. | 3. First Prenuptial Molt. |
| 4. First Nuptial Plumage. | 4. First Postnuptial Molt. |
| 5. Second (or Adult) Winter Plumage. | 5. Second (or Adult) Prenuptial Molt. |
| 6. Second (or Adult) Nuptial Plumage, etc. | 6. Second (or Adult) Postnuptial Molt, etc. |

Later plumages would be 'winter' and 'nuptial,' followed by 'prenuptial' and 'postnuptial' moults. This scheme furnishes definite terms which are almost indispensable for a proper explanation of the plumage changes which regularly occur as birds pass from immature to adult dress and from summer to winter plumages.

In many species of the Shore Birds, plumage differences between young and old are lost at an early period. All adults at the postnuptial moult assume a plumage that in one class of

birds is often indistinguishable from the juvenal, in another indistinguishable from the first winter dress, the difference being in the young birds. The first class of young birds retains the juvenal plumage, modified only by wear, until a mid-winter or spring moult takes place, the second assumes a distinct first winter plumage by an early postjuvenal moult, which involves only the body feathers, the tertiaries and a few of the lesser wing-coverts. As both classes of young birds and the adults of all species undergo a prenuptial moult by which the nuptial or breeding dress is assumed, it seems desirable to speak of a prenuptial moult (rather than of a delayed postjuvenal) in birds of the first class. The facts are not altered, but we must say, for convenience, that in this class the postjuvenal moult is omitted or suppressed and the first winter plumage is simply the juvenal modified by wear.

The following are some of the species belonging to the first class, viz., American Woodcock (*Philohela minor*), Wilson's Snipe (*Gallinago delicata*), Pectoral Sandpiper (*Tringa maculata*), Solitary Sandpiper (*Totanus solitarius*), Spotted Sandpiper (*Actitis macularia*), Long-billed Curlew (*Numenius longirostris*), Killdeer (*Ægialitis vocifera*), Semipalmated Plover (*Ægialitis semipalmata*), and Turnstone (*Arenaria interpres*).

The second class includes, among others, the following, viz., Red Phalarope (*Crymophilus fulicarius*), Northern Phalarope (*Phalaropus lobatus*), Wilson's Phalarope (*Phalaropus tricolor*), American Avocet (*Recurvirostra americana*), Dowitcher (*Macrorhamphus griseus*), Long-billed Dowitcher (*Macrorhamphus scolopaceus*), Stilt Sandpiper (*Micropalama himantopus*), Knot (*Tringa canutus*), White-rumped Sandpiper (*Tringa fuscicollis*), Least Sandpiper (*Tringa minutilla*), Semipalmated Sandpiper (*Ereunetes pusillus*), Dunlin (*Tringa alpina*), Red-backed Sandpiper (*Tringa alpina pacifica*), Greater Yellow-legs (*Totanus melanoleucus*), Yellow-legs (*Totanus flavipes*), Willet (*Symphemia semipalmata*), Bartramian Sandpiper (*Bartramia longicauda*), Buff-breasted Sandpiper (*Tringytes subruficollis*), Sanderling (*Calidris arenaria*), Black-bellied Plover (*Charadrius squatarola*), and American Golden Plover (*Charadrius dominicus*).

It is evident that the feathers of the juvenal plumage must be

fully developed before the southward migration is attempted; but the occurrence of many specimens of many species far from their breeding grounds shows the serviceable nature of these feathers, which are only slightly less resistant to wear than those of adults. Here are two birds of the first class which illustrate the far southern range in juvenal dress, viz., *Tringa maculata*, Am. Mus. Nat. Hist., No. 30861, October, Brazil, and *Actitis macularia*, Am. Mus. No. 71427, September 14 Colombia; and there is a goodly number of other specimens and other species too numerous to specify from localities this side of the equator.

Birds of the second class also press far south in many cases before the postjuvénal moult sets in, as proved by a number of species, among them the following, viz., *Macrorhamphus griseus*, Am. Mus. No. 50148, July 5, Florida; *Tringa canutus*, Am. Mus. No. 26968, August 8, England; *Tringa fuscicollis*, Am. Mus. No. 34858, October 21, Brazil; *Totanus melanoleucus*, Am. Mus. No. 30859, October, Brazil; *Charadrius dominicus*, Am. Mus. No. 30856, August, Bolivia, and No. 58677, November 14, Brazil; *Charadrius squatarola*, Am. Mus. No. 61634, October 25, France and *Calidris arenaria*, Am. Mus. No. 30860, August, Bolivia, these specimens showing only the beginning of the postjuvénal moult. Usually, however, young birds of these and other species gradually assume new feathers of the winter dress as they travel towards their winter quarters. It is hardly necessary to specify them by number, for they are to be found in every collection. Some species are earlier than others, and there is considerable individual variation, but the first winter plumage is generally assumed during August and September, so that October or, at most, November specimens have completed the moult, which apparently never includes the flight-feathers nor the tail.

Adults, easily recognizable in the early autumn, at least until the postnuptial moult is completed, by the worn and scalloped-out feathers of the nuptial dress, probably leave their breeding grounds before beginning to moult and gradually assume their winter dress as they loiter here and there on their southward journey. They move southward much earlier than is generally supposed, and probably make long flights without stopping. I have examined specimens of various species taken in Cuba, Texas,

California, Mexico, and even Peru and Bolivia, which are in full worn nuptial plumage. Among others that have acquired much of the adult winter plumage may be mentioned the following, viz., *Tringa canutus* (U. S. Nat. Mus. No. 78419, ♀, September 1, Florida), retaining only four old primaries; *Actitis macularia* (U. S. Nat. Mus. No. 134832, August 28, San Clemente Island, California), with only four old primaries left; *Calidris arenaria* (U. S. Nat. Mus. No. 128793, October 8, Aldabra Island, Indian Ocean) with three old primaries, and No. 151633, July 17, Venezuela, with three old primaries; *Totanus melanoleucus* (Amer. Mus. Nat. Hist. No. 51240, ♀, July 29), Arizona, with six old primaries; *Macrorhamphus scolopaceus* (Am. Mus. Nat. Hist. No. 50585, ♂, July 5, Florida) with four old primaries; *Arenaria interpres* (G. B. Sennett, No. 5159, ♂ [= ♀], July 1, Texas), the distal or first primary still a pin point, the second just out of its follicle, the remainder full grown, while the third primary of each wing and the proximal secondaries are still pulpy.

The beginning of this postnuptial moult, as well as of the post-juvenal, is shown by birds in almost every collection, the first feathers appearing on the humeral tracts, near their middle, and later, on the back and at either side of the breast. These feathers are fairly large, but come from very small follicles, so that the sheaths do not persist long and are often lost in the process of skinning, as I have learned by experience. The body feathers seem to come in less rapidly and more irregularly than with *Passerine* species, so that it is extremely easy to overlook their moult in studying dried skins. The renewal of the body feathers seems generally to be in advance of the remiges at the postnuptial moult, and to follow them at the first prenuptial. The tenth or proximal primary of each wing falls first, followed quite leisurely by the more distal, moult beginning among the secondaries with the distal member when only three or four old primaries are left. The inner secondaries, better known as tertiaries, precede the proximal primaries. The greater coverts, and a band of the lesser coverts near the anterior edge of the wing, also precede them. The rectrices are not renewed as a rule before nearly all of the primaries have been replaced. The last feathers to be renewed are those of the chin, sides of head and mid-abdomen. A few

winter specimens with the outer primaries much more worn than the inner seem to point to the checking of moult in some cases and this failure to moult at the proper time is much more common in body feathers.

Few birds taken on the North Atlantic coast show moult of the remiges in progress, but many species in collections, those in my own collection represented by specimens studied while fresh, show renewal of the body feathers by the postnuptial moult which, as proved by southern specimens, is usually completed in August or September. The adults of species with a postjuvenal moult begin moulting earlier than young birds, a fact which may account in part for the migration of males earlier than the females and young, just as in Passerine species. My experience for years has been that the birds seen in July and early August are largely adults, and intelligent gunners everywhere tell the same story. Later than October it is not easy to distinguish old from young unless the latter retain here and there distinctive feathers of the juvenal plumage, or the former retain a few feathers of the nuptial dress. A few tell-tale feathers remaining until a later period of moult are invaluable in fixing age, for plumage differences between young and old in winter are slight and inconstant as a rule, although more marked in some species than in others.

The amount of wear shown by the plumage varies with the individual, and black feathers outwear those of any other color. The primaries and secondaries show so little wear that even the microscope will not demonstrate how much newer one feather is than another without other evidence, but the finding of growing feathers often confirms the testimony of worn plumage, and it is upon the testimony of such 'blood-feathers,' as they have felicitously been called, that all my conclusions are based.

There is abundant evidence that adults and young both undergo a prenuptial moult which certainly involves the body plumage of both; in young birds of many species the moult is complete, except perhaps in the case of some females; in adults it does not seem to include the remiges nor the rectrices.

Comparatively few specimens show winter moult of the remiges, but among them may be mentioned the following, viz., *Crymophilus fulicarius* (U. S. Nat. Mus. No. 86423, February 21, Lower

California), with the three proximal primaries growing, and no new body feathers as yet; *Tringa fuscicollis* (U. S. Nat. Mus. No. 116227, ♀, January 16, Gregory Bay, Patagonia) the primaries new except the first, the middle pair of rectrices new, but no new body feathers; *Actitis macularia* (U. S. Nat. Mus. No. 169037, ♀, February 9, Culebra Id., W. I.), retaining one old primary, the old tail and old body plumage; *Charadrius squatarola* (Amer. Mus. Nat. Hist. No. 39072, ♀, February 27, Florida), with two old primaries remaining, together with old tail and body plumage; and other specimens, with incomplete data, which confirm the evidence of those cited. It is possible, although not probable, that some of these are adults, but the plumage seems to indicate young birds, and the rarity of adults at any season is an argument against their being adults. At all events, a moult begins in January or February, and there are many specimens of many species which show growth of new body feathers later in the winter. April specimens are often in the midst of moult or at the end of it, some of them with fresh remiges and rectrices, and others with them evidently much worn. My impression is that the more worn birds are adults, the fresher ones young birds which complete their moult earlier. The probability also is that species with a postjuvenal moult are later in consummating the prenuptial, but the material available does not furnish conclusive evidence upon these points. The numerous specimens in worn winter plumage showing no evidence of moult during February need not be cited. As adult females are indistinguishable from young males at this season, and adult males are not conspicuously different, the difficulty of drawing conclusions from them, even after the beginning of the prenuptial moult, becomes apparent.

In addition to the young birds just cited there are some others which illustrate the onset of this moult presumably in adults, viz., *Tringa alpina pacifica* (U. S. Nat. Mus. No. 102142, ♂, March 29, Japan), with worn wings and tail, but new 'blood-feathers' scattered on the body; another (No. 154206, May 10, California) still showing new feathers in the new plumage; *Calidris arenaria* (Amer. Mus. Nat. Hist. No. 45580, ♂, April 13, California), with new 'blood-feathers' on the body at various points; another (No. 60007, ♀, April 30, Florida) more advanced,

the wings and new tail indicating probably a young bird; *Macrorhamphus scolopaceus* (Amer. Mus. Nat. Hist. Nos. 49438, ♀, and 49439, ♂, March 10, California), with new body feathers just appearing; *Tringa minutilla* (Amer. Mus. Nat. Hist. No. 59511, ♀, April 22, Trinidad, W. I.), still chiefly in winter dress; and *Ægialitis semipalmata* (Am. Mus. Nat. Hist. No. 29850, ♂, April 14, South Carolina), with a few new feathers. These are only a small part of the specimens that might be cited in proof of the occurrence of a prenuptial moult in both young and old, and further evidence may be found in May specimens which are in fresh new plumage except for such feathers as fail to moult. A smaller number of these are to be found on birds that appear to be adults, a greater number on young ones, and females regularly renew fewer feathers than males of like age.

In the foregoing pages, I have outlined the facts, as we find them, concerning the moulting of the Shore Birds, but in order to emphasize and bring them out still more clearly, I purpose taking up a few familiar species and tracing their moults and plumages in natural sequence.

SPOTTED SANDPIPER (*Actitis macularia*).

1. *Natal Down.* This is well developed before the bird leaves the egg, forming a dense, continuous clothing. Above, the filaments or neossoptiles are partly banded with black and pale brown, producing a mottled olive-gray appearance, and partly black, producing the median stripe from the bill to the tail. Below, they are white, those of the sides of the head buff-tinged except a black loreal and postocular streak. The anterior border and extremity of the wing and the orbital ring are white.

Many specimens from different localities illustrate this stage. Two in my own collection (J. Dwight Jr., No. 1221, June 21, New York; and No. 3612, July 6, Prince Edward Island, Canada) are typical examples.

2. *Juvenal Plumage* acquired by a complete postnatal moult, the down filaments being really a continuation of the apical barbs of the succeeding feathers, in most cases, but not found at the

apices of the remiges. This stage is characterized by the olive-green upper surface, the feathers of the back especially being edged with buff and having a subterminal bar of dull black, those of the wing-coverts with a second indistinct bar. Below, pure white prevails, with gray on the sides of the throat.

The growth of this plumage may be traced during July and early August, males and females being indistinguishable. One of my birds (J. D. Jr., No. 4123, July 7, Quebec) shows remiges about two thirds grown, the rectrices about one third and with the down still attached, which also adheres to new feathers of the crown, back, and sides of breast; on the forehead, sides of head, the nape, throat and mid-abdomen the down has not yet been displaced. Another (J. D. Jr., No. 6437, August 5, Nova Scotia) with grown but pulpy outer primaries, is so advanced that down only remains on the chin, the bird being fully feathered. Another (J. D. Jr., No. 6812, July 15, New York) is still more advanced, with few traces of immaturity.

As adults at their postnuptial moult assume a dress scarcely distinguishable from this, I can only point out some differences that unfortunately do not hold in all cases, especially in females. Young birds are practically without dusky shaft-lines on the feathers of the throat, the barring of the back and wing-coverts is duller, the tertiaries lack the dusky blotches of the adult and the outer pairs of rectrices are less distinctly white and blotched more irregularly with duller black.

In both young and adults, wear soon begins to change the appearance of this dress, which is usually called the autumnal plumage. Not only do the buff edgings fade, but the feather tips break away until even the subterminal barring is lost, except on the wing-coverts where the second bar is retained late into the winter. August specimens, from the Atlantic coast as well as from Arizona, show gradual loss of the edgings. Two specimens in my collection (J. D. Jr., No. 6814, September 5, New York and No. 6695, September 1, Quebec) still retain most of the buff edgings, although much faded, while two others (J. D. Jr., No. 386, August 26, Connecticut, and No. 6816, September 18, New York) have almost completely lost even the dusky bars. The southern range while in this plumage is shown by a somewhat

worn specimen from South America (Am. Mus. Nat. Hist. No. 71427 September 14 Colombia).

3. *First Winter Plumage* acquired apparently wholly by wear, by which the upper parts become uniformly olive green *without edgings* except a few dusky bars on the wing-coverts. It is convenient to call this stage the winter dress, and to consider the postjuvénal moult as suppressed in this species. There are many Passerine birds in which the nuptial or breeding plumage is simply the autumnal dress modified by wear, and if we are justified in calling a worn autumnal or winter plumage, the breeding dress of these birds, so we are justified in calling a worn juvenal plumage, the first winter plumage. Whatever we choose to name it, it is worn at least until the beginning of January, as proved by numerous October, November and December specimens, of which, among many with incomplete data, I may cite the following as apparently young birds: Amer. Mus. Nat. Hist. No. 51294, ♂, December 8, Arizona; U. S. Nat. Mus. No. 86420, ♀, January 6, Lower California; U. S. Nat. Mus. No. 120277, ♀, January 3, Honduras.

4. *First Nuptial Plumage* acquired by a prenuptial moult probably complete, as indicated by a number of specimens, some unfortunately without dates. While it is possible that some of these birds which show actual feather growth, especially of the remiges, are adults, it is not at all probable, judging by their plumage and by the usual scarcity of adults at any season. The following serve to prove the occurrence of a complete moult, viz., U. S. Nat. Mus. No. 169037, ♀, February 9, Culebra Island, has renewed the primaries, except the worn distal one, the rectrices and body plumage being mostly old and worn; U. S. Nat. Mus. No. 74051, ♂, February, St. Vincent Island, West Indies, retains two old distal primaries, tail and body plumage; U. S. Nat. Mus. No. 81016, ♂, [no date], St. Thomas Island, W. I., has the remiges and part of the rectrices still in their sheaths, and new nuptial feathers among those of the worn body plumage; and U. S. Nat. Mus. No. 80973, ♂, [no date] St. Eustatius Island, W. I., retains still four old primaries, but new body feathers are growing at several points.

Specimens in abundance from Florida and Arizona, taken in

April, are in fresh new plumage, indicative of recent moult, and some of them occasionally show 'blood-feathers.' One (Am. Mus. Nat. Hist. No. 34844, April 1, Brazil), with fresh remiges and rectrices and a sprinkling of half-grown body feathers, indicates the practical completion of the prenuptial moult before winter quarters have been abandoned.

In this, the breeding plumage, males and females are usually to be distinguished, males being more extensively spotted on the white lower parts. The spots are subterminal, so that wear first removes the white tips, and later on much of the black which, late in the summer, assisted by fading, may nearly disappear from the throats, in some cases, as well shown by one of my birds (J. D. Jr., No. 3938, ♂, August 19, Quebec). The barring of the back in the nuptial dress is so heavy on each feather and so far removed from its apex, that it is only lost in excessively worn specimens, as shown by another of my birds (J. D. Jr., No. 4171, ♂, July 29, Quebec).

5. *Second or Adult Winter Plumage* acquired by a complete postnuptial moult accomplished in August or September.

Adults, as birds may now be called, either move south in the autumn before moulting or possibly take such good care of themselves while moulting that few find their way into collections. Some reach Cuba (U. S. Nat. Mus. No. 23601, September 3) and Mexico (U. S. Nat. Mus. No. 57709, August 14) without moult, while others, taken far from their breeding grounds, show the postnuptial moult in progress, viz., U. S. Nat. Mus. No. 134832, August 28, San Clemente Island, California, still retains four old primaries and all of the tail except the middle pair of rectrices which are sprouting; Amer. Mus. Nat. Hist. No. 30863, August, Bolivia, which has five old primaries, the rest being new as well as the rectrices (except the outer pair) and the greater coverts; and two birds No. 71426, September 13, and No. 71428, September 14, Colombia, showing extensive moult of the body plumage.

The plumage acquired resembles closely the juvenal, under which the slight average differences have been noted, and wear soon fades and removes the buff edgings as in the young bird.

6. *Second or Adult Nuptial Plumage* acquired by a prenuptial moult which undoubtedly includes the body-feathers, tertiaries,

and a few of the lesser coverts, but apparently not the remiges nor the rectrices. I have already discussed the evidence which proves a moult in adults as well as young birds, the late winter specimens with worn wings and tails indicating either adults or possibly young females. One specimen may be cited in full winter dress at a late date (U. S. Nat. Mus. No. 133016, March 19, [Arizona ?]).

The following species has a distinct postjuvenile moult.

SANDERLING (*Calidris arenaria*).

1. *Natal Down*. Not seen by me.

2. *Juvenal Plumage* acquired by a complete postnatal moult. This plumage is much washed with buff, the edgings of many of the feathers distinctly buff, including those of the sides of the breast, the tint fading quite rapidly. A bird (Am. Mus. Nat. Hist. No. 60751, ♀, August 20, Labrador) of fresh plumage illustrates this stage.

3. *First Winter Plumage* acquired by a partial moult which includes the body plumage, tertiaries, and wing-coverts but not the remiges nor rectrices. A wholly gray plumage, white below, is assumed and, save for left-over tell-tale feathers, especially tertiaries, young birds become practically indistinguishable from adults that have completed their postnuptial moult, although the feathers of young birds are paler centrally and therefore with less obvious shaft-streaks. September and October specimens in every collection show the gradual growth of the gray body feathers and one from Bolivia (Amer. Mus. Nat. Hist. No. 30860, August) shows that this far southern locality may be reached before the moult is far advanced. Another specimen (U. S. Nat. Mus. No. 161921, October 1, Virginia) is largely in first winter dress; also one (G. B. Sennett, No. 404, ♂, November 1, Pennsylvania) and one (Am. Mus. Nat. Hist. No. 64551, ♀, November 9, Lower California), possibly an adult, is wholly gray. Among winter specimens of young birds, determined by retained juvenal feathers, especially dusky-tipped tertiaries, the buff edgings of which fade to white, are the following, viz.; U. S. Nat. Mus. No. 163525, January 9, California; No. 102063, Jan-

uary, Heligoland Id., and Amer. Mus. Nat. Hist. No. 64542, ♂, January, Heligoland Id. Several much worn February birds that may be either young birds or adults are still in full winter dress.

4. *First Nuptial Plumage* acquired by a prenuptial moult that appears to be complete, although possibly not in females. The reddish dusky barred feathers of the throat are assumed with the black, gray or rusty edged feathers of the back, young and old being practically indistinguishable although adults are richer in color and there are fewer winter feathers left behind when the moult is completed. Several specimens illustrate different stages, viz.: Am. Mus. Nat. Hist. No. 49827, ♂, April 19, Florida; No. 45485, ♀, April 13, California; No. 60007, ♀, April 30, Florida, all showing 'blood-feathers' of the body plumage and of the rectrices to a greater or less degree.

5. *Second or Adult Winter Plumage* acquired by a complete postnuptial moult in July, August, September and October. Many August and September specimens show new gray winter feathers creeping in on the back while new white ones below gradually efface the reddish colors. As early as July 7 one specimen (U. S. Nat. Mus. No. 151633, Venezuela) is largely in winter dress, retaining only three old primaries, while another (U. S. Nat. Mus. No. 102064, ♂, October 31, Peru) still retains five old primaries. Two birds (U. S. Nat. Mus. Nos. 128793 and 128795, October 8, Aldabra Id., Indian Ocean) are in the midst of moult, retaining three distal primaries, the others, with most of the body plumage and the inner pairs of rectrices being new. The full winter dress, which differs very little from that of young birds, is shown by various specimens; U. S. Nat. Mus. No. 128796, November 10, Aldabra Id., Indian Ocean; G. B. Sennett, No. 3938, January, Texas; Amer. Mus. Nat. Hist. No. 39075, February 23, Florida (possibly a young bird).

6. *Second or Adult Nuptial Plumage* acquired by a prenuptial moult that involves the body plumage and part of the wing-coverts but apparently not the remiges nor rectrices. An undoubted adult (Amer. Mus. Nat. Hist. No. 45580, ♂, April 13, California) is instructive, retaining a few feathers of the previous nuptial dress, much worn, part of the winter dress less worn, and with new body feathers growing at many points. A similar spec-

imen (G. B. Sennett, No. 3685, ♀, March 28, Texas) may also be cited. The full plumage may not be acquired until early in May.

Another species that has the same sequence of moults and plumages as the Sanderling, is the Dunlin which may well be considered along with its North American representative.

DUNLIN (*Tringa alpina*).

RED-BACKED SANDPIPER (*Tringa alpina pacifica*).

1. *Natal Down.* The chick above has rusty and golden brown and black mottling, with small white dots. The mixed colors are due to banded down filaments or neossoptiles and the spotting to subterminal white areas. Below, including cheeks and forehead, the neossoptiles are buffy white, a dusky loreal and postocular streak and a fainter malar one.

2. *Juvenal Plumage* acquired by a complete postnatal moult. It is not generally known that birds in this plumage are quite heavily spotted below with black, the back with reddish and buff edgings, and a buff wash on the throat, so that they much resemble adults in breeding dress. I have examined several July and August birds from Alaska, a perfectly typical one, still retaining a little down on the head and neck being (U. S. Nat. Mus. No. 88881, August 3, Pt. Barrow, Alaska).

3. *First Winter Plumage* acquired by a partial postjuvenal moult involving the body plumage, sometimes all, and sometimes part of the tertiaries, a few of the wing-coverts but neither the remiges nor rectrices. The gray plumage, white below, is assumed, scarcely distinguishable from adults in winter dress, but the central part of the dorsal feathers is usually paler than in adults, likewise the gray shaft-streaks of the throat and sides. Left-over juvenal feathers are often found, and the black-spotted ones of the lower parts become faded and worn and may easily be mistaken for those of the adult. This plumage is fully assumed by October, as shown by many specimens from many localities, numerous November and December birds showing little evidence of further moult, viz.: Am. Mus. Nat. Hist. No. 69813, ♂, October 16, New

York; No. 64972, ♀, October 19, New York; No. 47255, ♂, November 11, Washington; No. 26963, ♂, November 25, France; No. 45544, November, Texas; No. 64535, December 20, Denmark; and J. Dwight Jr. Nos. 674, ♀, 675, ♂, and 676 ♀, November 24, Delaware.

Mid-winter specimens are few and show no signs of the prenuptial moult, which evidently takes place later. The juvenal tertiaries, when retained, lose their buffy edgings and dusky tips by wear and so this distinguishing character between young and old is often obliterated. One specimen (J. Dwight Jr. No. 4897, January, California) is certainly a young bird.

4. *First Nuptial Plumage* acquired by a prenuptial moult that is apparently complete. March and April specimens regularly show growth of the new body plumage; but it is not easy to distinguish adults from young, even in winter plumage, and they become indistinguishable at the first prenuptial moult. The wings and tails of adults are usually much worn. The fresh plumage is dull black above with rusty edgings and gray feather tips; below, white spotted with black and veiled with white edgings, the spotting in males so heavy on the abdomen that a black area is produced by loss of the edgings, which wear away rapidly.

The following specimens illustrate this moult, viz.: U. S. Nat. Mus. No. 102142, ♂, March 29, Japan; Am. Mus. Nat. Hist. No. 26962, ♀, March 23, France; No. 45543, ♂, April, California; No. 55008, ♂, April 25, Texas.

The incompleteness of the prenuptial moult, especially in females, is shown by a scattering of winter feathers found on summer birds, and when at the postnuptial moult new feathers are added to those of two other periods of growth, fine opportunity is afforded for those who would theorize about wonderful color changes and restorations.

5. *Second or Adult Winter Plumage* acquired by a complete postnuptial moult, occurring earlier than the postjuvenal of young birds, but in adults as well as young an almost identical plumage is assumed. A bird, U. S. Nat. Mus. No. 102125, ♂, August 14, Petchora River, Russia, retains six old primaries of the nuptial dress and new body feathers are growing, while No. 162593, ♂,

September 7, North China, has renewed the flight feathers and only part of the body plumage. Among the many specimens examined in the gray and white dress, which results from this moult, there are few that can be identified with certainty as adults, both young and old, males and females, being practically indistinguishable in winter dress.

6. *Second or Adult Nuptial Plumage* acquired by a prenuptial moult which does not appear to involve the wings nor the tail with the exception of the tertiaries and a few wing-coverts. What has already been said of the first nuptial plumage applies equally well to the second or third, and the specimens there mentioned may, some of them, be adults. One other that I believe to be an adult (Amer. Mus. Nat. Hist. No. 29888, ♂, April 13, South Carolina) is acquiring new body feathers, the wings, tail and tertiaries much worn.

Two other species that on account of similarity of plumage may well be considered together are the following:

AMERICAN GOLDEN PLOVER (*Charadrius dominicus*).

BLACK-BELLIED PLOVER (*Charadrius squatarola*).

1. *Natal Down*. Mottled above, yellowish below.

2. *Juvenal Plumage* acquired by a complete postnatal moult. Extra-limital specimens of *C. dominicus* in this plumage are the following, viz.; Am. Mus. Nat. Hist. No. 30856, August, Bolivia, and eight birds from Brazil taken between October 5 and November 14. Specimens of *C. squatarola* are the following, viz.: Am. Mus. Nat. Hist. No. 61634, ♂, October 25, France; No. 61633, November 9, Amoy, China; U. S. Nat. Mus. No. 119351, ♂, December 26, West Indies.

3. *First Winter Plumage* acquired by a partial postjuvenal moult late in the fall which involves only the body plumage. No. 61634 just cited shows an early stage. The winter dress is deep gray above (yellow-tinged in *C. dominicus*) and chiefly white below, indistinctly mottled on the breast and not differing greatly in the two species.

4. *First Nuptial Plumage* acquired by a prenuptial moult that is

practically complete except perhaps in some females. Only one specimen (*C. squatarola*, Am. Mus. Nat. Hist. No. 39072, ♀, February 27, Florida) shows actual moult of the primaries, this bird having renewed all but the two distal, a few nuptial body feathers are growing, the tail is old. Another specimen of *C. squatarola*, however (U. S. Nat. Mus. No. 161033, February 16, Philippine Islands) has fresh wings and part of the body feathers are new and a specimen of *C. dominicus* (Am. Mus. Nat. Hist. No. 67499, ♀, March 26, Texas) is quite similar although it is possible they are both adults.

The results of this moult may be seen in many spring and early summer specimens, the old gray winter feathers, which are most abundantly retained in females, scattered through the black of the lower parts and less conspicuously on the back among the golden spotted nuptial feathers of *C. dominicus* or the white-tipped ones of *C. squatarola*.

5. *Second or Adult Winter Plumage* acquired by a complete postnuptial moult. Many August and September specimens show new gray feathers creeping in among the dark ones of the nuptial dress, *C. squatarola* apparently beginning to moult earlier than *C. dominicus*. A specimen of *C. dominicus* (Am. Mus. Nat. Hist. No. 30855, August, Bolivia) shows an early stage, neither the remiges nor the rectrices as yet involved, and indicates that these feathers, as in other species, are later than those of the body. It is not surprising that no specimens showing their moult have found their way into collections for winter adults of all species are surprisingly rare.

6. *Second or Adult Nuptial Plumage* acquired by a prenuptial moult which evidently includes the body feathers but apparently not those of the wings and tail. The difficulty of distinguishing adults from young, added to imperfect data, makes me hesitate about citing several specimens with worn flight-feathers that show growth of new body feathers, but the evidence that new body plumage is assumed by moult is conclusive if we examine birds even in worn breeding dress.

A few specimens of *Charadrius plumialis* indicate precisely the same sequence of plumages and moults here outlined.

It is only a matter of suitable specimens and of time, for the

plumages and moults of other species to be worked out as I have done with the few here recorded, which have been selected to show that natural moult and wear are the cause of plumage differences. The Golden Plover, the Sanderling and the Dunlin have long been cited as proof of strange and wonderful color changes without moult. If there remains now a peg on which to hang such belief, I fail to discover it, and commend to the theorists the facts above presented which they have ignored in constructing their theories. They have started with the eminently unphysiological assumption that a grown feather *can* absorb fresh coloring matter, they have failed to recognize seasonal plumage differences between adults and young, males and females and they have supposed that the parti-colored feathers, which regularly grow on the dividing line between light and dark areas, were in process of recoloration.

In a word they have failed to recognize consecutive moults and their effects, and I trust that my present contribution to the subject will serve to open the eyes of those who imagine they see fresh colors developing in old feathers.

GENERAL NOTES.

Occurrence of the Little Blue Heron in Labrador. — On May 23, 1900, a Little Blue Heron (*Ardea cærulea*) was brought to Mr. Ernest Doane at Lance au Loup, Labrador, by a man who had shot it there a day or two before. Mr. Doane skinned the bird and sent it in a shipment just made to my brother and me. The specimen (No. 4433, Coll. of E. A. & O. Bangs) is a young male just emerging from the white plumage, having some blue feathers in the wings, a few long blue back plumes, and the back, neck and head much intermixed with grayish. While to me, little interest attaches to such wanderers it still, perhaps, is as well to record them, and so far as I know this is the first time the Little Blue Heron, has been taken in Labrador. — OUTRAM BANGS, *Boston, Mass.*

The Marbled Godwit at Pine Point, Maine. — I recently saw for the first time a mounted specimen of the Marbled Godwit (*Limosa fedoa*) which was taken by Mr. Harry Crocker at Pine Point, near Portland, in 1891. Records of this bird in Maine are so few that the following data from Mr. Crocker will be of interest. He writes me: "I killed the bird on either the 8th or 9th of August, 1891. I shot two of them along the shore of the bay at Pine Point. They made no call that I could hear; but, after trying several, I used that of the Yellow-legs, upon hearing which they turned and came towards me. Mr. Benjamin F. Woodward, of Cambridge, Mass., has one of the birds." — NATHAN CLIFFORD BROWN, *Portland, Me.*

The Swallow-tailed Kite at Piermont, New York. — I made an observation this morning (August 22, 1900) that must be of interest. Just at noon, with the sky bright and clear, I stepped out into the yard in time to see a Swallow-tailed Kite (*Elanoides forficatus*) sailing over. The bird passed over me at a height of about one hundred feet and it is quite impossible for me to have been mistaken about the identification. I have seen a number of these birds in the South, and of course have handled the dried specimens. The sun was shining brightly and disclosed all the beautiful details of plumage.

Piermont is on the west bank of the Hudson, and about thirty miles above New York city. — G. L. NICHOLAS, M. D., *Piermont, N. Y.*

The Western Red-tail at Toronto, Canada. — While collecting Hawks north of this city on November 5, 1895, I obtained a good specimen of *Buteo borealis calurus*, male, which is the first time I have heard of this bird appearing in this vicinity. — I. HUGHES SAMUEL, *Toronto, Ontario.*

Description of the Nestling Plumage of *Falco islandus*. — While preparing a report on the various collections of birds received by the American Museum of Natural History through the Peary Expeditions to Greenland, I learned from Mr. J. D. Figgins, taxidermist of the expeditions of 1896-97, that Mr. R. D. Perry, one of the members of the expedition of 1897, secured two specimens of *Falco islandus* from the nest. The plumage of the species at that age having a very important bearing on the question of the relationships of the Greenland Gyrfalcons, I wrote Mr. Perry with the result that he kindly forwarded the birds for examination, and with his permission, I append the following description, which applies equally to both specimens:

Crown and nape as in the adult, white with narrow blackish shaft-streaks increasing in width posteriorly; back white, the apical half of the feather with a guttate or elliptical ovate fuscous mark bordered by white, and sometimes continuing as a narrow line down the shaft of its feather to the base; rump white with narrow fuscous shaft-streaks; quills with broken blackish bars and a sub-apical blackish tip, agreeing in pattern with the quills of the adult bird, but with the white portions, especially of the outer web, slightly suffused with pale ochraceous; wing-coverts as in the adult but with the blackish markings linear rather than transverse; tail, about two thirds grown, pure white without bars or other markings; under parts white, as in the adult, with a few fuscous shaft-streaks; under tail-coverts white, unmarked.

In general appearance these birds are quite as white as fully adult individuals and apparently prove that *Falco islandus* is, as has been claimed, white at all ages, and they thus furnish confirmatory evidence of its specific distinctness.

Moulting specimens of *Falco rusticolus* show that the immature, linear-marked plumage is directly succeeded by the mature barred plumage and it is probable, therefore, that the adult plumage of *F. islandus* is acquired in the same manner. — FRANK M. CHAPMAN, *American Museum Natural History, New York City*.

Prairie Horned Larks Nesting in Maine. — In his 'List of the Birds of Maine,' page 82, Mr. Knight says respecting the occurrence of *Otocoris alpestris praticola*: "It is a regular migrant in many parts of the State, and it is not improbable that it may ultimately be found breeding within our State." Its first record of occurrence in the State was made by Mr. James Carroll Meade of North Bridgton (*cf.* Maine Sportsman, April, 1897, p. 6).

The members of the Maine Ornithological Society then naturally looked more carefully to their identifications of *Otocoris*, with the result, as stated by Mr. Knight in his list, as mentioned above.

In the January, 1900, number of the 'Journal of the Maine Ornithological Society,' page 2, Mr. Arthur H. Norton, of Westbrook, mentions seeing two specimens of *Otocoris* in Andover, Oxford Co., Maine, which he

believed undoubtedly were of the Prairie variety, but he was not able to make sure, as they took wing before he could train his glass on them.

After this note our members were on the lookout for a definite record of its nesting in the State. The writer had the pleasure of making this record, for on June 26, while driving from Waterville to Pishon's Ferry, on the east side of the Kennebec River, I heard the unmistakable notes of *Otocoris*. Getting my glass from my traveling case, I alighted from my carriage and went in search of the two birds, which had flown from the road into a field of plowed ground near by. The birds were too wary and could not be approached near enough to decide positively that it was *O. a. praticola*.

Three weeks later, July 17, while driving along the same route, six Horned Larks flew from the road into a cornfield beside the road. Having my glass ready for use, I at once left my team and went in search of them. I flushed them, and farther down the road, I saw several more Larks feeding in the road with the Grass Finches. While examining them with my glass, they flew to a large piece of plowed ground and scattered about. In all there were twelve or fourteen birds, mostly young birds. I then drove to the next house, borrowed a gun and shells loaded with number six shot and went back and shot one adult female and two young. I could not get near enough to get any more adult birds. These proved to be *praticola*, and established a record of their breeding in the State. August 7 (three weeks later), I looked for them at the same place, but was not able to find a bird.

The plowed ground which they frequented was a large patch, that had been plowed in the spring, but being so wet, the owner, Mr. Lowell White, had not planted it, though in July it was dry enough and rather sandy, and well covered in patches with weeds. This field is situated about one half mile from the Kennebec River, in Kennebec County, bordering Somerset County. There are large fields of sandy land, and it is a typical location for *Otocoris alpestris praticola* to nest. — J. MERTON SWAIN, *Portland, Me.*

The European Linnet in Westchester County, N. Y. — Several years ago — in the late autumn or early winter of 1894 — I secured an adult female European Linnet (*Acanthis cannabina*), at Scarboro', N. Y., two miles south of Sing Sing. The bird was shot from the top of a maple tree, in a field about a mile east of the Hudson River. For several days previous to this I had frequently seen and heard in the region a small flock of very peculiar Linnets, which were undoubtedly of the same species, as I several times saw them at short range. There were about five in all, two or three being red-breasted, russet-backed males. They were most often seen alone, but not infrequently associated with flocks of American Goldfinches.

As far as I remember, the female was, when shot, the only Linnet among several Goldfinches, and the other Linnets were not seen thereafter. The bird secured was in bright, unworn plumage, and this fact, combined

with that of the presence of others of the species, makes it unlikely that it was an escaped cage-bird. It was identified by Dr. Allen and Mr. Chapman, and is preserved in my father's collection.

So far as I know, this species has not been introduced into this country, though it is always possible for such birds to fly aboard trans Atlantic liners at sea, and stay with them to the end of the voyage. It is probably by this means that most of the stray European land birds get to America, and *vice versa*.

Dr. Marcus S. Farr, of the New York State Museum, advises me to record this occurrence in 'The Auk,' even at this late date.—GERALD H. THAYER, *Monadnock, N. H.*

The Rough-winged Swallow breeding in Connecticut, and other Notes.—On June 17, 1900, I secured a male Rough-winged Swallow (*Stelgidopteryx serripennis*) which was flying about a little brackish pond by the Thames River, near Gales Ferry. Later, on June 23, I found in a neighboring railroad embankment two nests of this species. Both were dug into the bank about an arm's length and just under the overhanging sods and roots. One of the nests, which I examined carefully, contained five pin-feather covered young. The parents were seen circling nervously about, all four being present, which led me to believe another nest must be in the vicinity, which I failed to discover.

I found also two male Hooded Warblers (*Wilsonia mitrata*) on the Gales Ferry side of the river on June 23 and 24, opposite the Montville shore where I found a single bird last June (see Auk, XVI, 1899, p. 360); these two birds were singing among the mountain laurel bushes on the southern hillsides. I also found a single male Worm-eating Warbler (*Helminthus vermivorus*) singing in the same locality on June 23, and secured him on the 24th. A pair of Mourning Doves (*Zenaidura macroura*) were seen on June 17, feeding along the beach at Gales Ferry.—REGINALD HEBER HOWE, JR., *Longwood, Mass.*

The Proper Name for the Florida Yellow-throat. In 'The Auk' for July 1, 1900 (p. 225), Mr. William Palmer adopts Audubon's name *roscoe* for the southern form of the Maryland Yellow-throat because, to quote from his paper, "there can be no question as to the Florida bird occurring along the Gulf Coast"; and also, because the type specimen was "taken in a cypress swamp." The first reason is a matter of opinion as yet unconfirmed by specimens and, in the event of its being substantiated, of little value, under the circumstances. The second reason is an excellent one for the rejection of the name *roscoe* for the resident bird.

The Florida Yellow-throat, is, so far as my experience goes, by no means a common bird. In Florida, during the winter, it is doubtless outnumbered by *trichas* by at least fifty to one. I have invariably found it in or near growths of scrub palmetto, whence the local name 'Palmetto Bird.'

Audubon's type of *roscoe* was an immature bird, of which he wrote: "Not long after the publication of my first volume, I discovered the error which I had committed in making the bird represented in my twenty-fourth plate a new species, it being only the young of *Sylvia trichas* of Latham" (Orn. Biog. V, 463). It is true that Audubon might have described the young of the resident bird, and hence, therefore, of the Florida Yellow-throat which, Mr. Palmer states with such positiveness, occurs "along the Gulf Coast." Audubon's type, however, was taken in western Mississippi in September, the month when the southward migration of *trichas* reaches its height, and, furthermore, was shot from "the top branches of a high cypress" (Orn. Biog. I, 124)—facts which, to my mind, essentially prove it to have been a representative of the northern and not of the resident bird, for which latter, therefore, we are not qualified in adopting the name *roscoe*.—FRANK M. CHAPMAN, *American Museum of Natural History, New York City*.

The Mockingbird at Barnegat, N. J., and on Long Island, N. Y.—On August 25, while in the vicinity of Barnegat, N. J., I was surprised to see a pair of wild Mockingbirds (*Mimus polyglottos*), and on inquiry I found a man who said he had heard a Mockingbird singing several times during the spring and early summer. On the following day I saw another Mockingbird, presumably one of those I had seen the day previous, as it was near the same locality.

On August 27, at Floral Park, L. I., I saw a strange bird light on the top of one of the full-grown maple trees that line the avenue along which I was walking. Before I had approached very near the bird again took wing and from the manner of its flight, its size, and prominent white patches upon its wing, I am confident that it was a Mockingbird. While the distance was rather great to identify it absolutely, I know of no other bird which could have shown such wing color, except the Red-headed Woodpecker, but its manner of flight was not that of the Woodpecker, and we certainly would not expect to see a Woodpecker perched on the top branches of a tree like a Robin.—JOHN LEWIS CHILDS, *Floral Park, Long Island, N. Y.*

Brief Michigan Notes.—Cook, in his *Birds of Michigan*, records Baird's Sandpiper and Gray-cheeked Thrush as rare in the State. As a matter of fact both are common migrants here. My acquaintance with the Sandpiper (*Tringa bairdii*) dates from 1890. I collected about twenty-five specimens during July and August of that year, and noticed several hundred. They make their appearance the latter part of July and are rarely seen after September 1. They prefer the Least and Semi-palmated Sandpipers for companions but I have often observed them among flocks of the Pectoral Sandpiper, Lesser Yellow-legs and Killdeer. The Gray-cheeked Thrush (*Hylocichla aliciae*) arrives from the north about a week

earlier than the Olive-back and remains a week later, overlapping the Hermit by two or three days.

September 27, 1893, I shot a fine male Nelson's Sparrow (*Ammodramus nelsoni*). When first seen it was in company with a pair of Savanina Sparrows. The three were bathing in a little pool on a mud flat. Later it flew to a reed top and commenced drying its feathers. This taking to a reed top was unusual and resulted in its death.

September 4, 1899, I shot a Knot (*Tringa canutus*) in immature plumage. It came straight in from the lake and perched on a boulder about 300 feet from shore. This was near the town of Port Austin, Huron County. The local hunters called it a young 'Robin Plover' and did not consider it rare.

In June, 1899, my brother added the Black-throated Blue Warbler (*Dendroica caerulescens*) to the list of birds breeding here. I have never personally observed this species in summer, but have found the Black and White (*Mniotilta varia*), Golden-winged (*Helminthophila chrysoptera*) and Cerulean (*Dendroica caerulea*) to be common breeders, and am sure the Sycamore (*D. dominica albilora*) breeds although no nests have yet been discovered.

During ten years of careful field work I have seen the Cardinal Grosbeak (*Cardinalis cardinalis*) but twice and secured both specimens — female, November 1, 1897, and male, December 3, 1899. — J. CLAIRE WOOD, Detroit, Michigan.

List of the Rarer Birds met with during the Spring of 1900 in the Immediate Vicinity of Toronto. — The following list of the rarer birds which came under my personal observation while taking field notes during the past season in the immediate vicinity of Toronto may be of interest to other observers.

- | | | |
|--------|--|------------------|
| May 8. | Cape May Warbler (<i>Dendroica tigrina</i>), | 1 male seen. |
| " 9. | " " " " " " | 1 male taken. |
| " 10. | " " " " " " | 1 male taken. |
| " 11. | Prairie Warbler (<i>Dendroica discolor</i>), | 1 male taken. |
| " 12. | Orange-crowned Warbler (<i>Helminthophila celata</i>), | 1 male taken. |
| " " | " " " " " " | 1 female taken. |
| " 13. | Tennessee Warbler (<i>Helminthophila peregrina</i>), | seen. |
| " 15. | Black-poll Warbler (<i>Dendroica striata</i>), | 3 males seen. |
| " 16. | Kirtland's Warbler (<i>Dendroica kirtlandi</i>), | 1 male taken. |
| " 18. | Cape May Warbler (<i>Dendroica tigrina</i>), | 1 male taken. |
| " " | Black-poll Warbler (<i>Dendroica striata</i>), | males plentiful. |
| " 19. | Orchard Oriole (<i>Icterus spurius</i>), | 1 male taken. |
| " " | " " " " " " | 1 female seen. |
| " 20. | Cape May Warbler (<i>Dendroica tigrina</i>), | 1 male seen. |
| " 21. | Tennessee Warbler (<i>Helminthophila peregrina</i>), | 2 seen. |
| " 22. | " " " " " " | 25 or more seen |

and three taken.

- May 22. Black-poll Warblers, very abundant from this date till June 2.
 " " Connecticut Warbler (*Geothlypis agilis*), 1 male taken.
 " 23. " " " " 1 male taken.
 " 24. Tennessee Warbler (*Helminthophila peregrina*), 1 female taken.
 " " Connecticut Warbler (*Geothlypis agilis*), 1 male taken.
 " 26. Black-poll Warbler (*Dendroica striata*), 1 female taken.
 " 27. Connecticut Warbler (*Geothlypis agilis*), 2 males seen.
 " 28. " " " " 1 female taken.
 " 30. " " " " 1 female seen.
 " " Mourning Warbler (*Geothlypis philadelphia*), 1 male seen.
 June 1. Yellow-bellied Flycatcher (*Empidonax flaviventris*), 1 female taken.
 June 2. Orchard Oriole (*Icterus spurius*), 1 male seen.
 " 4. " " " " 1 male taken and another male seen.
 June 9. Orchard Oriole (*Icterus spurius*), 2 males seen.
 July 5. " " " " a pair nesting.
- Respecting the above, the records for *Dendroica discolor* and *D. kirtlandi* are the first, so far as I can ascertain, for this locality; and *Icterus spurius*, while recorded once or twice before from as far east as this in Canada, I believe this to be the first record of its nesting.—
 I. HUGHES SAMUEL, *Center Island, Toronto, Canada.*

RECENT LITERATURE.

Beyer's 'The Avifauna of Louisiana,'¹—This is the first attempt at an enumeration of the birds of the State of Louisiana, and is therefore a most welcome contribution to our knowledge of the distribution of the birds of the Gulf Coast. It is the result, the author tells us, "of personal observation and collecting during fully sixteen years within the limits of our State. In the pursuit of the study of ornithology I have visited nearly every section of the State at different seasons of the year, and in this way learned to understand the variation of bird-life effected by the

¹ Louisiana Herpetology, with a Check-list of the Batrachians and Reptiles of the State, and the Avifauna of Louisiana, with an Annotated List of the Birds of the State. By George E. Beyer, Tulane University. Reprinted from the Proceedings of the Louisiana Society of Naturalists, 1897-1899. New Orleans, La., 1900. (Birds, pp. 1-45 of reprint.)

annual spring and fall migration." The list proper is preceded (pp. 3-8) by a very detailed account of the physical conditions of the region, the varied topography giving rise to a number of markedly different areas, although the higher portions of the country, in the northwestern part of the State, do not exceed an elevation of four hundred feet. The list numbers 323 species and subspecies, and a list of 22 others is given as of probable occurrence, several of which we are surprised to see lack confirmation as inhabitants of the State. The annotations are for the most part brief, but add greatly to the value of the paper, stating fully the manner of occurrence of the birds as known to the writer. While the nomenclature of the A. O. U. Check-List is followed, the changes in names made in the last (ninth) Supplement are not adopted, the paper having been presented for publication in March, 1899, though not printed till a year or more later. The information conveyed in the present list concerning the species that breed in the State is especially important, and helps to define at least where many of our common northern species do not breed. It is surprising, however, to find that the White-bellied Swallow (*Tachycineta bicolor*) "occurs everywhere in the State, and at all times of the year." The Burrowing Owl (*Speotyto cunicularia hypogæa*) is stated to be "quite numerous on the prairies, and it undoubtedly breeds there as well." Probably the identifications of a few of the species will bear revision, as the Horned Larks, the Seaside Sparrows, and the Prairie Hen, which latter is most likely the subspecies *attwateri*. The list evinces, however, careful and conscientious work and is a most welcome and exceptionally important addition to our list of faunal papers.—J. A. A.

Burns's 'A Monograph of the Flicker.'¹—In his praiseworthy monograph Mr. Burns presents the results of his devotion to the study of this species "the leisure moments of five years," with "the generous aid of a large corps of enthusiasts." Although the literature of the subject has been extensively utilized, the monograph is based to a large extent upon the author's own observations and those of his many correspondents, and is therefore to a large degree new material. The paper gives first the names of the species, both technical and vernacular, with an account of their probable origin and significance, the vernacular names alone, including their variants, numbering at least one hundred. Then follows a detailed treatment of all the principal incidents of the birds' natural history, as its geographical distribution, migrations, manner of flight, roosting, 'drum calls,' its varied notes, calls and song period, mating, nesting habits, eggs, molt, food, enemies, etc., even to hybridism and atavism. In short, the eighty-two pages constituting the 'Monograph' are well

¹ A Monograph of the Flicker (*Colaptes auratus*). By Frank L. Burns. The Wilson Bulletin, No. 31, April, 1900, pp. 1-82. Price, 50 cts.

filled with well-selected matter, and go far toward answering every important inquiry respecting the life-history of this notable species.—J. A. A.

Nash's 'Check-List of the Birds of Ontario.'¹—Mr. Nash's briefly annotated list of the birds of Ontario numbers 302 species, and is based on the author's personal knowledge, except where credit is given to other authority. It cannot fail to be a very useful and convenient summary of the ornithology of the Province, and is very neatly and correctly printed.—J. A. A.

Macoun's 'Catalogue of Canadian Birds.'²—The scope and character of Mr. Macoun's 'Catalogue of Canadian Birds' is thus succinctly stated in Dr. George M. Dawson's prefatory note, namely: "It is intended to enumerate all of the birds of the Dominion systematically and to bring together the principal known facts in regard to their distribution, migrations and breeding habits." In the author's preface he further states that the 'Catalogue' is to also include "Newfoundland, Greenland and Alaska," or the whole of North America north of the United States. "The nomenclature and the numbers given in the latest edition and supplements of the Check-list published by the American Ornithologists' Union have been made the basis of arrangement of the catalogue." It would have been advisable to have also added a separate and consecutive series of numbers for the species of the 'Catalogue.' Part I includes Nos. 1 to 316 of the A. O. U. Check-List, and takes in rather more than four fifths of all the species.

The first enumeration of the birds of this extensive region is that contained in the second volume of the 'Fauna Boreali-Americana' of Swainson and Richardson, published in 1831, which contained 267 species. In 1878 a second enumeration was made by Mr. Montague Chamberlain, restricted however to Canada, and thus excluding Alaska and Greenland, the number of species being 556.

¹Check List | of the | Birds of Ontario | and | Catalogue of Birds in the Biological Section | of the | Museum. | Department of Education | Toronto. | [By C. W. Nash.] Toronto: | Warwick Bro's. & Rutter, Printers, Etc., 68 and 70 Front St. West. | 1900.—8vo, pp. 58.

²Geological Survey of Canada. | George M. Dawson, C. M. G., L. L. D., F. R. S., Director. | — | Catalogue | of | Canadian Birds. | — | Part I. | Water Birds, Gallinaceous Birds, | and Pigeons. | Including the following Orders: | Pygopodes, Longipennes, Tubinares, Steganopodes, | Anseres, Herodiones, Paludicolæ, Limi- | colæ, Gallinæ, and Columbæ. | — | By John Macoun, M. A., F. R. S. G., Naturalist to the Geological Survey of Canada. [Seal.] Ottawa: | Printed by S. E. Dawson, Printer to the Queen's Most | Excellent Majesty, | 1900.—8vo, pp. vii+218. Price 10 cts.

The present 'Catalogue' is based largely on the work of the Canadian Geological Survey, Mr. Macoun having been collecting notes and observations for this work since 1879, while Mr. Spreadborough has been similarly engaged since 1889, under Mr. Macoun's supervision. Their journeys have extended to various parts of this wide area, from Newfoundland and Labrador to British Columbia and Vancouver Island. The unpublished notes of many other observers have also been utilized, as well as the literature of the subject. For Alaska, Greenland, Labrador, and Arctic Canada the 'Catalogue' is based almost entirely upon previously published observations, and even for Southern Canada, the published contributions of Downs, Chamberlain, McIlwraith, Dionne, Wintle, Seton-Thompson, Fannin, and others are freely cited. There are thus brought together under each species the principal known facts of its distribution, with usually a paragraph headed 'Breeding Notes,' with a list of the specimens in the Ottawa Museum, collected by the Survey. The 'Catalogue,' containing, as it does, such a large amount of previously unpublished matter, combined with a summary of the more important previously published records, forms a compendium of ornithological information for the northern half of North America of great permanent interest and value. It is proposed to complete Part II the coming winter; and the author invites ornithologists who may receive Part I, to send him any additional facts on the birds contained therein with a view to their publication as a supplement to Part II.—J. A. A.

Proceedings of the Delaware Valley Ornithological Club.¹—Besides the minutes of the meetings, which contain many records of interesting captures and notes of field work, are two papers published in full. These are: (1) 'Migration Data on City Hall Tower,' Philadelphia, by William L. Baily, which concludes with a tabular list of 56 species of birds that were killed by striking the lighted tower from August 27, 1897, to October 31, 1899. The number of individuals was 527, of which 452 were killed from August 23 to October 31, 1899. (2) 'The Summer Birds of the higher parts of Sullivan and Wyoming Counties, Pa.,' by Witmer Stone. This is a briefly annotated list of 98 species. Mr. Stone states: "The boreal element in the avifauna of Pennsylvania has been steadily decreasing for a number of years past as the primitive hemlock and spruce forest disappears before the advance of the lumberman. . . . The cutting of the timber and the fires which so frequently follow totally change the aspect of the country and completely exterminate many boreal plants, while the altered conditions admit of the introduction of a more southern fauna, as evidenced

¹ Abstract of the Proceedings of the Delaware Valley Ornithological Club of Philadelphia. No. III. For the years 1898 and 1899. Published by the Club. 1900. 8vo., pp. 28.

by the presence of late years of the Cottontail Rabbit, Quail, Towhee, Indigo Bird, Yellow Warbler, Thrasher, Chat, etc."—J. A. A.

Cooke's 'Further Notes on the Birds of Colorado.'¹—This is a 'Second Appendix' to Prof. Cooke's 'The Birds of Colorado,' published in 1897, this, and the 'First Appendix,' published in 1898, being paged continuously with the original catalogue. Several species are here added to the list of Colorado birds, making the number 387, of which 243 are known to breed. This is an addition of about 25 species during the three years since the publication of the original list. Many notes are also added respecting the distribution and breeding ranges of other species. Much space is given to notes based on the study of the collection of Colorado birds made by the late Edwin Carter, representing "the work of Mr. Carter for more than thirty years. Much of the material was gathered in the immediate vicinity of Breckenridge, and the rest in Middle Park and South Park," at altitudes of 7500 to 9500 feet. The 'Bibliography of Colorado Ornithology' is continued to date.

As showing the progress made in the study of Colorado birds, Prof. Cooke remarks (p. 220): "There are twenty-five Warblers given in the last edition of the A. O. U. Check-List whose range is said to be 'Eastern United States,' or 'Eastern United States to the Plains,' thus not including Colorado in their habitat," of which eleven have now been found in Colorado, and Prof. Cooke expects that the other fourteen will yet be found in that State. This large appendix of nearly 60 pages is provided with an index, and merits the high praise we gave the original catalogue (*cf.* Auk, XIV, 1897, pp. 331, 332).—J. A. A.

Economic Ornithology.—In the last number of this Journal (XIII, pp. 314, 315) attention was called to Dr. T. S. Palmer's important contribution to the subject of Bird Protection, forming Bulletin No. 12 of the U. S. Department of Agriculture, Division of the Biological Survey. This was promptly followed by Circular No. 28 of the Division of the Biological Survey, also by Dr. Palmer, consisting of a 'Directory of State Officials and Organizations concerned with the Protection of Birds and Game,' giving a list of the Fish and Game Commissioners of each State, and of each of the Provinces of Canada; also a list of National and State Organizations interested in this work, including their officers and wardens, with their addresses; and also a list of the Audubon Societies, organized especially for the study and protection of birds, with the addresses of their Secretaries.

¹ Further Notes on the Birds of Colorado. By W. W. Cooke. Bulletin 56 (Technical Series No. 5), Agricultural Experiment Station of the Agricultural College of Colorado, May, 1900, pp. 181-239.

This was immediately followed by the Biological Survey Circular No. 29, issued over the signature of the Hon. James Wilson, Secretary of the Department of Agriculture, which deals with the Lacey Act. The Circular is entitled 'Protection and Importation of Birds under Act of Congress approved May 25, 1900.' It gives the text of the act, and explains in detail its various provisions, as relating to (1) Propagation and Distribution of Birds; (2) Importation of Foreign Animals and Birds; (3) Transportation of Prohibited Species; (4) Interstate Traffic in Animals or Birds killed or shipped in violation of State Laws; (5) Preservation and Importation of Birds in Charge of the Biological Survey. "The object," it is stated, "of placing this work in charge of an Executive Department of the Federal Government was merely to supplement and not to hamper or replace the work hitherto done by State commissions and organizations; in other words, to coordinate and direct individual efforts, and thus insure more uniform and more satisfactory results than could otherwise be obtained. Greater uniformity in State legislation and better enforcement of existing laws can be secured only by the most complete cooperation between the forces now at work in the cause of bird protection."

The importation of the English or European House Sparrow and the Starling is absolutely prohibited, as is also their "deliberate shipment" from one State to another.

By this special order of the Secretary of Agriculture, "the Division of the Biological Survey is hereby placed in charge of all matters relating to the preservation and importation of animals and birds under this Act, and until further notice the Assistant Chief of that Division [who fortunately is Dr. T. S. Palmer] will have immediate charge of the issue of permits for the importation of animals and birds from foreign countries. All inquiries regarding bird protection and all requests for publications on the uses or preservation of birds should be addressed to the Chief of the Biological Survey."

Another publication requiring notice in the present connection is Dr. Palmer's 'A Review of Economic Ornithology in the United States,' published in the 'Yearbook' of the U. S. Department of Agriculture for 1899 (pp. 259, 292). In this important paper the scope and purpose of 'economic ornithology' is defined, followed by a brief historic sketch of the 'development of American ornithology,' and comments on the following topics: 'Investigations as to the Value of Birds'; the 'Commencement of Investigations along Modern Lines,' 1858 to 1880; and 'A Period of Notable Advance in Investigations,' covering the period from 1880 to the present time, exclusive of the work of the Biological Survey, begun in 1885. He says, in summing up the principal results due to the work of individual investigators: "The important researches thus briefly noticed include four investigations on the Robin, an examination of 630 Nebraska birds [by Prof. Samuel Aughey in 1878], about 1,600 Wisconsin birds [by Prof. F. H. King in 1882], and an investigation of 2,084 birds of

prey, Grackles and other species in Pennsylvania [by Dr. B. H. Warren in 1886], comprising in all more than 5,000 stomachs."

In recounting the work of the Biological Survey he gives an account of the establishment of the Division, its first publications, its functions from the standpoint of economic ornithology, and the results of its investigations, (1) regarding supposed injurious birds, (2) regarding beneficial birds, and (3) a summary of the results of its fourteen years' work.

He then takes up the subject of the 'Commercial Uses of Birds,' and under the subheadings 'Game,' 'Eggs,' 'Feathers,' and 'Guano,' gives some very startling statistics respecting the slaughter for the market of such birds as the Prairie Chicken and Passenger Pigeon, and the enormous destruction of the eggs of Gulls and Terns, Murres, Guillemots and Albatrosses, for commercial purposes, and of Terns and Herons for their plumage. The trade in Guano is not necessarily destructive to the birds to which its deposition in such vast quantities is due; but the statistics here given are of great interest, both from a commercial and an ornithological point of view. A map showing the principal Guano Islands in the Pacific Ocean "bonded under Act of 1856" for citizens of the United States, illustrates this portion of Dr. Palmer's article. "During the thirty years from 1869 to 1898, 283,871 tons of guano, valued at \$3, 229,832, were brought from islands appertaining to the United States."

The paper concludes with a consideration of 'Measures for the destruction, Preservation, and Introduction of Birds.' Under this head are given the history and results of 'bounty laws,' 'game laws,' 'criticism of game laws,' 'efforts at uniformity in game laws,' 'special restrictions,' and 'prospect for enforcement of game laws.' Also a brief summary is given of the introduction of foreign birds and its results.

In concluding this notice of Dr. Palmer's excellent paper it may interest many readers of 'The Auk' to know what led to the establishing of the Division of the U. S. Department of Agriculture known at present as the Biological Survey--a branch of the official work of the Government now so far-reaching in its relations, not only in respect to economic ornithology, but to scientific ornithology and mammalogy. Dr. Palmer says: "One of the most important results of the organization of the American Ornithologists' Union was the impetus given to the study of economic ornithology. Committees on the English Sparrow, bird migration, and geographical distribution were appointed at the first meeting, and elaborate investigations were at once begun. The work, however, had been planned on such a large scale that it soon outgrew the resources of the committees, and at the second annual meeting of the union it was determined to present a memorial to Congress to secure an appropriation for continuing it. . . . In recognition of the importance of the work, Congress granted an appropriation of \$5,000, to be expended under the division of Entomology of the Department of Agriculture, and on July 1, 1885, established a section of economic ornithology. Under the direction of Dr. C. Hart Merriam investigations were outlined on a broad scale, to

include the 'food habits, distribution, and migrations of North American birds and mammals in relation to agriculture, horticulture, and forestry.' A year later the section became an independent division, and in 1896 its name was changed by Congress to the broader title of Division of Biological Survey."—J. A. A.

Meyer and Wiglesworth's '*Birds of Celebes*.'¹—We take great pleasure in bringing to the notice of the readers of 'The Auk' this excellent monograph of the '*Birds of Celebes*,' in two large quarto volumes of over 1100 pages, beautifully illustrated with nearly 50 colored plates. It embodies the results of many years of work by experts in this particular field, the senior author, Dr. A. B. Meyer, the eminent Director of the Dresden Museum, having spent several years (1870-73) in Celebes collecting the materials for this long-contemplated work. He has thus not only the advantage of thoroughly knowing the physical conditions of the region, but of having made the personal acquaintance of many of the species in life. His valuable 'Field Notes on the Birds of Celebes' appeared in 'The Ibis' for 1879, and were followed by a long series of special papers on the birds of the East Indian Archipelago.

The region here included as the 'Celebesian area' embraces "The Talaut Islands in the north, the Sulu Islands in the east, and the Djampea Group in the south. . . . The boundary so chosen adjoins to the north the southern limit of the Philippines, as defined by Tweeddale, Worcester and Bourns, and others; to the east it coincides with Salvadori's western border, as drawn in his '*Ornitologia della Papuasie e delle Molluchi*,' and by other writers; to the south it takes in all the islands between Celebes and the Lesser Sundas. The book may thus be said to fill up an ornithological gap, and the bounds as chosen appear also to be the most natural, except possibly in the case of the Djampea Group." The number of species included is 393, with about 150 additional subspecies, each being treated fully as regards its bibliography, its plumages and relationships, its geographical distribution and life-history, so far as the details are known. The numerous colored plates give for the first time adequate illustrations of the 70 species here figured.

The 'Introduction,' occupying 130 pages, treats subjects of general interest, as the 'Travel and Literature' of the region (pp. 2-16); the 'Seasons and Winds in the East Indian Archipelago' (pp. 17-37); 'Migration in the East Indian Archipelago' (pp. 38-52); 'Variation,' in its five phases of (1) individual variation, (2) geographical variation, (3)

¹ The | *Birds of Celebes* | and | the Neighboring Islands. | By | A. B. Meyer and L. W. Wiglesworth. | — | With 45 Plates (42 coloured) and 7 coloured Maps. | — | Berlin: | R. Friedländer & Sohn. | 1898. — 2 vols. 4to. Vol. 1, pp. i-xxxii + 1-130 + 1-392, pll. 17 (14 col.) and 7 col. maps; Vol. II, 2 ll., pp. 393-962, pll. vol. 28.

seasonal changes, (4) sexual differences, and (5) changes depending upon age' (pp. 53-79); and 'Geographical Distribution' (pp. 80-130). 'Migration,' 'Variation,' and 'Geographical Distribution' are discussed from the broadest standpoint and with admirable conservatism. Migration proper, though occurring to only a limited extent, is well-marked in the Indian Archipelago, but through lack of competent resident observers its details are to a large extent unknown. In referring to the local movements of certain species of Pigeons at particular seasons the following may be of interest: "For the sake of the general reader, who may be apt to suppose that narrow straits of the sea offer no barrier to the geographical distribution of tropical species, it may be mentioned that, so far from this being the case, there is reason to believe that resident species never, or very exceptionally, cross the sea; were it otherwise the species would not be found with such restricted ranges as is actually the case."

Under the subheading 'Hereditary effects of shelter and exposure' (pp. 73-79), an attempt is made to explain the origin of racket-tail-feathers and other similar modifications of the plumage, which are believed to be due to "the inherited results of attrition."

'Wallace's line' is considered at length under 'Geographical Distribution,' the views of previous authors cited respecting it, and the conclusion reached that, in our present state of knowledge of the question it is a "waste of time to speculate on it with the help of an up-and-down system for the islands and continents, just as required." The distribution of the Celebesian birds is tabulated and the relationships of the avifauna of Celebes as a whole and of the several lesser groups of islands is considered at length. "The results of our study of the birds of Celebes," say these authors, "as well as of those of the countries around, is that by its avifauna Celebes has far stronger connections with the Philippines than with any of the neighboring lands, and that the relation of its birds with the Oriental Region is more than twice as strong as with the Australian Region."

In regard to methods of nomenclature in the case of subspecies, the authors, while freely employing trinomials for such forms, are not fully satisfied that some better system may not be devised. They say: "Perhaps in future — when the want becomes sufficiently pressing to necessitate such a step — a somewhat considerable change in the nomenclature of the present day may be effected as follows: species as at present defined will remain under their original binomials; subspecies under trinomials; but the degree of relationship between the interconnecting forms to these subspecies will be displayed by the use of numbers — somewhat after the manner of chemical formulæ. Thus, in the case of *Haliastur indus* — taking four degrees of relationship into consideration — the typical subspecies will be *Haliastur indus typicus*, that of New Guinea *H. indus girrenera*; that of Celebes, which may be supposed to have three times as strong a connection with *girrenera* as with *typicus*, will be represented as *H. indus₁ girrenera₃*; that of Java being just about midway in charac-

ters as *H. indus₂ girrenera₂*; that of Malacca as *H. indus₃ girrenera*. This method could be carried to any degree of refinement, and is certainly less complex than the use of a quadrinomial such as *Haliastur indus girrenera ambiguus*," — the latter a name applied to the New Guinea form by Brüggeman. They add in a footnote: "We are not so sanguine as to believe, that our brother ornithologists will adopt our innovations of nomenclature, but we trust that future 'rules of nomenclature' will also take into consideration cases like this, and make some proposition which can be generally adopted." The suggestion is worthy of consideration, as the matter is one with which other workers have had to struggle, though as yet they have hardly dared to introduce innovations respecting it.

As a source of general information on the birds of Celebes and neighboring islands, this admirable work will ever remain an authority, not only on the technicalities of the subject but on the habits and distribution of the species. — J. A. A.

Publications Received.—Allen, J. A. List of Birds Collected in the District of Santa Marta, Colombia, by Mr. Herbert H. Smith. (Bull. Am. Mus. Nat. Hist., XIII, pp. 117-183, Aug. 25, 1900.)

Bangs, Outram. (1) Description of a New Rice Grackle (Proc. New Engl. Zool. Club, II, pp. 11, 12, June 30, 1900). (2) List of Birds Collected by W. W. Brown, Jr., at Loma del Leon, Panama. (*Ibid.*, pp. 13-34, Sept. 20, 1900.)

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Finsch, Otto. (1) On a Collection of Birds made by Mr. Karl Schädler at Sekru, northwest coast of New Guinea. (Notes from the Leyden Mus. Vol. XXII, pp. 49-69.) (2) Ueber eine auscheinend neue Art Dicaeum vom Arfak-Gebirge, New Guinea. (*Ibid.*, p. 70.) (3) Zur Catalogisirung der ornithologischen Abtheilung. (*Ibid.*, pp. 75-125.)

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Palmer, T. S. (1) A Review of Economic Ornithology in the United States. (Yearbook Depart. of Agriculture for 1899, pp. 255-292.) (2) A Directory of the State Officials and Organizations concerned with the Protection of Birds and Game, Circular No. 28, U. S. Dept. Agric., Division of Biological Survey, July 10, 1900.

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Bulletin Brit. Orn. Club, No. LXXIII, 1900.

Canadian Record of Science, VIII, No. 4, 1900.

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CORRESPONDENCE.

Habits of the Goony, and Notes on Variability of Birds' Songs.

EDITORS OF 'THE AUK':—

Dear Sirs:—In his interesting paper on the 'Occurrence of American Birds in Hawaii, in the July Auk (Vol. XVII, pp. 201-206) Mr. Henshaw, writing of the Brown Gooney (Gony?), *Diomedea chinensis*, records "the added fact that the Goonies also roost upon the vessel's yards at night." Is this a fact? My observations tend to a different conclusion. In several voyages on the Pacific I have noticed that these Albatrosses, early in the morning, invariably came from far astern of the ship, indicating that they had been resting on the water during the night. Although a cold-sea bird, they not infrequently follow a vessel many miles into the tropics.

May I advert to another item, on page 305? In the notice of 'Oberholser on Birds from Santa Barbara Islands, California,' a quotation is given praising the striking vocal performances of the Western Meadowlark (*Sturnella magna neglecta*). An editorial comment expressing non-agreement with Mr. Oberholser's conclusion is added. Mr. Oberholser is not alone in his admiration for the song of this species—or subspecies. Mr. Ernest Seton-Thompson, in one of his charming descriptions, is enthusiastic over the rapturous music this bird pours forth. In the many years I have known it, I never heard any note finer than the somewhat husky whistle, that was not to be compared, so I thought, with the clear flute-like carol of the Eastern Meadowlark. The question arises—may there not be individuals of surpassing vocal powers?

While in Nova Scotia the past summer I saw and heard a Robin singing in a strain unlike anything I had ever listened to from a Robin before. There was, it is true, the unmistakable Robin song, but it was strangely wild and glorified. There, too, was the bird, only of darker head and ruddier breast it seemed, as befitted this exceptional singer. Some writer—perhaps Mr. Torrey—has told us of local differences in voice in the case of the familiar *Merula migratoria*. May there not be still greater differences among individuals of certain forms? Baltimore Orioles may be cited as an instance in favor of this view.

G. S. MEAD.

San Francisco, Cal.,
August 18, 1900.

NOTES AND NEWS.

HEREAFTER, until further notice, 'THE AUK' will be issued from Cambridge, Mass., instead of from New York, its distribution having been placed in the hands of Mr. E. W. Wheeler, who for many years past has been 'The Auk' printer, to whom communications concerning subscriptions should be sent, addressed, Edward W. Wheeler, Printer and Publisher, 30 Boylston Street, Cambridge, Mass. Manuscripts intended for publication, books, and pamphlets for review, and all exchanges, should be sent, as heretofore, to the Editor, American Museum of Natural History, New York City, N. Y.

THE EIGHTEENTH ANNUAL CONGRESS of the American Ornithologists' Union will be held in Cambridge, Mass., beginning on the evening of November 12, 1900. The evening session will be for the election of officers and members and the transaction of the usual routine business. Tuesday and the following days, the sessions will be for the presentation and discussion of scientific papers, and will be open to the public. Members intending to present communications are requested to forward the titles of their papers to the Secretary, Mr. John H. Sage, Portland Conn., so as to reach him not later than November 8. The sessions will doubtless be held in one of the lecture halls of the University Museum.

In connection with this Congress of the Union it is proposed to hold a conference of representatives of the Audubon Societies, who will be sent as authorized representatives of their respective Societies, for the purpose of establishing a closer relationship between the Societies and the Union, and to consider ways and means for the more systematic prosecution of the work of the Societies.

MR. CHARLES C. MARBLE, an Associate Member of the American Ornithologists' Union, died at his home in Chicago, September 25, 1900, of heart disease, at the age of 52 years. Mr. Marble was until recently editor of the illustrated magazine 'Birds,' so well known as a popular magazine of ornithology. He was a native of Ohio and moved to Chicago in 1893.

AS DOUBTLESS known to many of our readers, Mr. Robert Ridgway has been engaged for some time in the preparation of a work on 'The Birds of North and Middle America,' the first volume of which is now ready for the printer. In reference to this, doubtless the most important work on American birds ever undertaken, we are permitted to give the following interesting information, kindly furnished at our request by Dr. Charles W. Richmond:

In September, 1894, Mr. Ridgway undertook, by direction of the Assistant Secretary of the Smithsonian Institution, the preparation of a treatise

on the ornithology of North and Middle America, and now, after six years of preliminary work, the first volume is ready for the printer, and has been placed in the hands of the publication committee of the National Museum.

The work is based mainly on the collections of the U. S. National Museum, but much additional material has been consulted in the large museums and private collections throughout the country. It will probably run through seven octavo volumes, of about 600 pages each.

About 3000 species and subspecies will be dealt with, accompanied by full descriptions, to which will be added the geographical distribution and synonymy of each. The synonymy, already completed, has been compiled with great care, special pains having been taken to verify each reference, giving the exact orthography of the original citation, and no references have been included which do not deal with some important fact in the distribution, life history, or status of the species. The type locality and location of the type of each species will be given, when known.

The general plan of the work will be similar to that of the recently published 'Fishes of North and Middle America,' by Jordan and Evermann; but owing to the more extensive literature of birds the synonymy will be of greater length.

Keys will be given for families, genera, and species, including all extralimital American families; in the case of genera and species extralimital members will be included only when few in number, when a brief synonymy will be given in footnotes.

Outline drawings of generic details of all genera included in the work will be given, similar to those in the author's 'Manual.' The geographical limits will be the entire continent of North America down to the southern extremity of the Isthmus of Panama, including the West Indies, isolated Caribbean islands, and Curaçao, Aruba, and Bonaire; also the Galapagos group.

The second volume is well under way, and will be ready for the printer about the end of the year. Much progress has been made on the remainder of the work, such as the synonymy, keys to families, sequence of subjects, etc., and it is expected that volumes will be completed at the rate of about one a year.

R. H. PORTER, the well known London publisher, announces as ready for publication an important work by Richard M. Barrington, entitled, 'The Migration of Birds as observed at Irish Lighthouses and Lightships, including the Original Reports from 1888-97, now published for the first time, and an Analysis of these and of the previously published Reports from 1881-87. Together with an Appendix giving the measurements of about 1600 Wings.' The work will form a thick octavo volume of 980 pages, and the edition will be limited to 350 copies. The price will be 25s net.

WE ARE glad to be able to announce that the second volume of the late Dr. Stark's 'Birds of South Africa' (R. H. Porter, London) is being prepared for publication by Mr. W. L. Sclater, from materials gathered by Dr. Stark. As shown by our notice of the first volume (Auk, XVII, pp. 190, 191), the work is a most important contribution to the ornithology of South Africa.

The same publisher will also soon bring out the second part of Volume II of G. E. Shelley's 'Birds of Africa,' thus completing the work, of which Volume I appeared in 1896, and Part I of Volume II in 1900. An extended notice of this important work will be given later.

A NEW work on 'The Birds of Ireland,' by Richard J. Ussher and Robert Warren, is announced by Gurney & Jackson (London), in one volume, demy octavo, of 450 pages, with 7 plates, 2 maps and other illustrations. Price, £1 10s. Special attention is given to the distribution of each species in Ireland, and also to its seasonal movements within the Island.

THE AUSTRALIAN MUSEUM, Sydney, will soon issue, as 'Monograph No. II,' the 'Catalogue of Nests and Eggs of the Birds of Australia,' by Mr. Alfred J. North, Ornithologist to the Australian Museum. This work was first published by the Trustees of the Australian Museum in 1889 as No. XII of their series of 'Catalogues,' but being now out of print, the Trustees have decided to issue a new work in an enlarged form by the same author. There will be representations of about 600 eggs on 30 full-sized plates and arrangements are being made to have them hand-colored for those who desire it.

Some of the nests and breeding haunts of the birds will also be shown on full-sized plates, but the greater number will be interspersed among the text, where also a large number of the birds themselves will be figured. The photographs, from which the plates representing the nests are made, have mostly been taken by the author personally, many of them *in situ*, and show the actual surroundings of the birds' homes. The black and white drawings of the birds are by Mr. Neville Cayley, so well known for his life-like drawings and paintings of birds. The letterpress will contain descriptions of the birds, their nests, eggs and haunts, and an account of their life history. The preparation of the plates is now well advanced. The work will be issued in parts, and the price to subscribers will probably not exceed 25s. for the complete work uncolored. Orders may be sent to the Librarian of the Australian Museum, Sydney, N. S. W., or to Kegan Paul, Trench, Trübner & Co., London, "or any Booksellers."

THOSE interested in the sanitation of birds' nests will find an interesting communication in the magazine 'Knowledge' for March, 1900 (p. 66), by Mr. Harry F. Witherby, entitled 'Mistle Thrush swallowing Droppings of Young.'

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ERRATA.

- Page 72, line 20 from bottom, for *Spinus tristus* read *Spinus tristis*.
 Page 97, in title of article, for GEO. G. BEYER read GEO. E. BEYER.
 Page 173, line 19 from top, for *Picoides americanus* read *Picoides articus*.
 Page 247, in title of article, for *RUFFINUS* read *PUFFINUS*.
 Page 346, line 10 from bottom, for *Ammodramus sandwichensis* read *Ammodramus sandwichensis savanna*.
 Page 347, line 10 from bottom, for BLACK-THROATED WARBLER read BLACK-THROATED GREEN WARBLER.
 Page 357, line 19 from top, for *Anorthura hiemalis pacificus* read *Anorthura hiemalis pacifica*.
 Page 357, line 8 from bottom, for *Hylocichla ustulatus* read *Hylocichla ustulata*.
 For additional *errata* see p. 324.
 By inadvertence, Mr. Knight's 'Some Notes on the Herring Gull,' p. 63, was reprinted on page 169.

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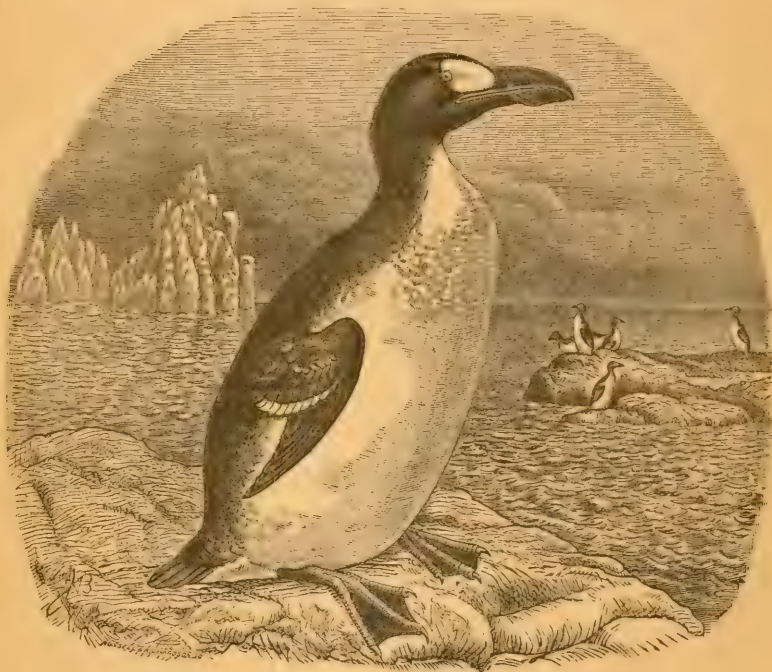
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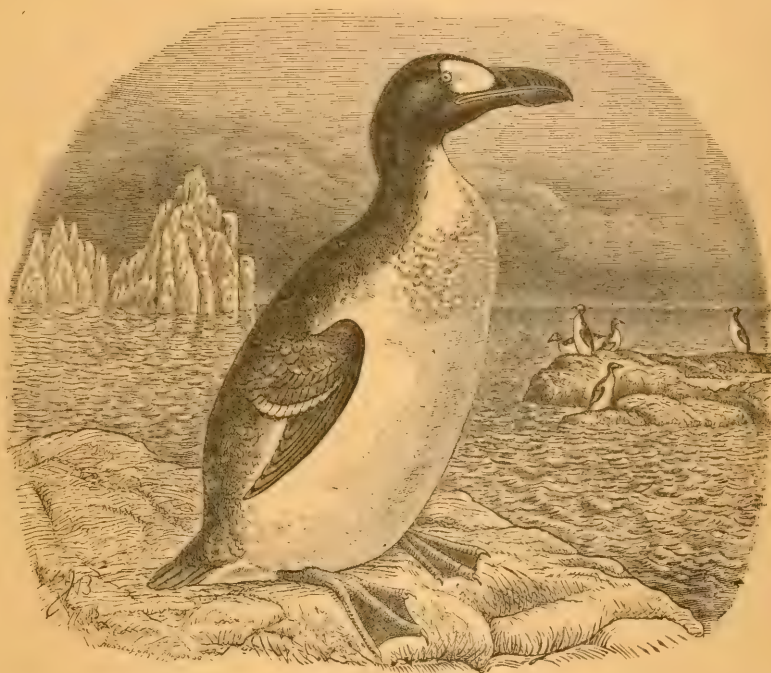
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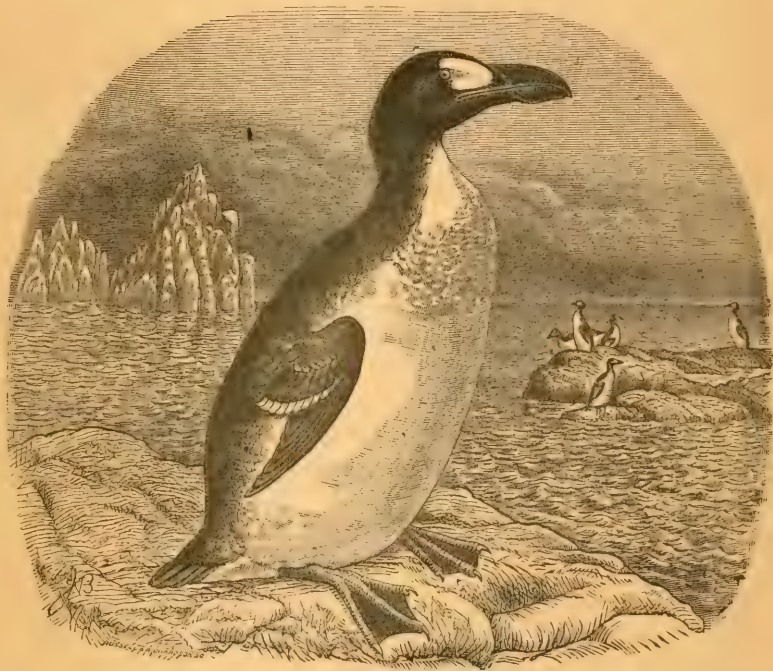
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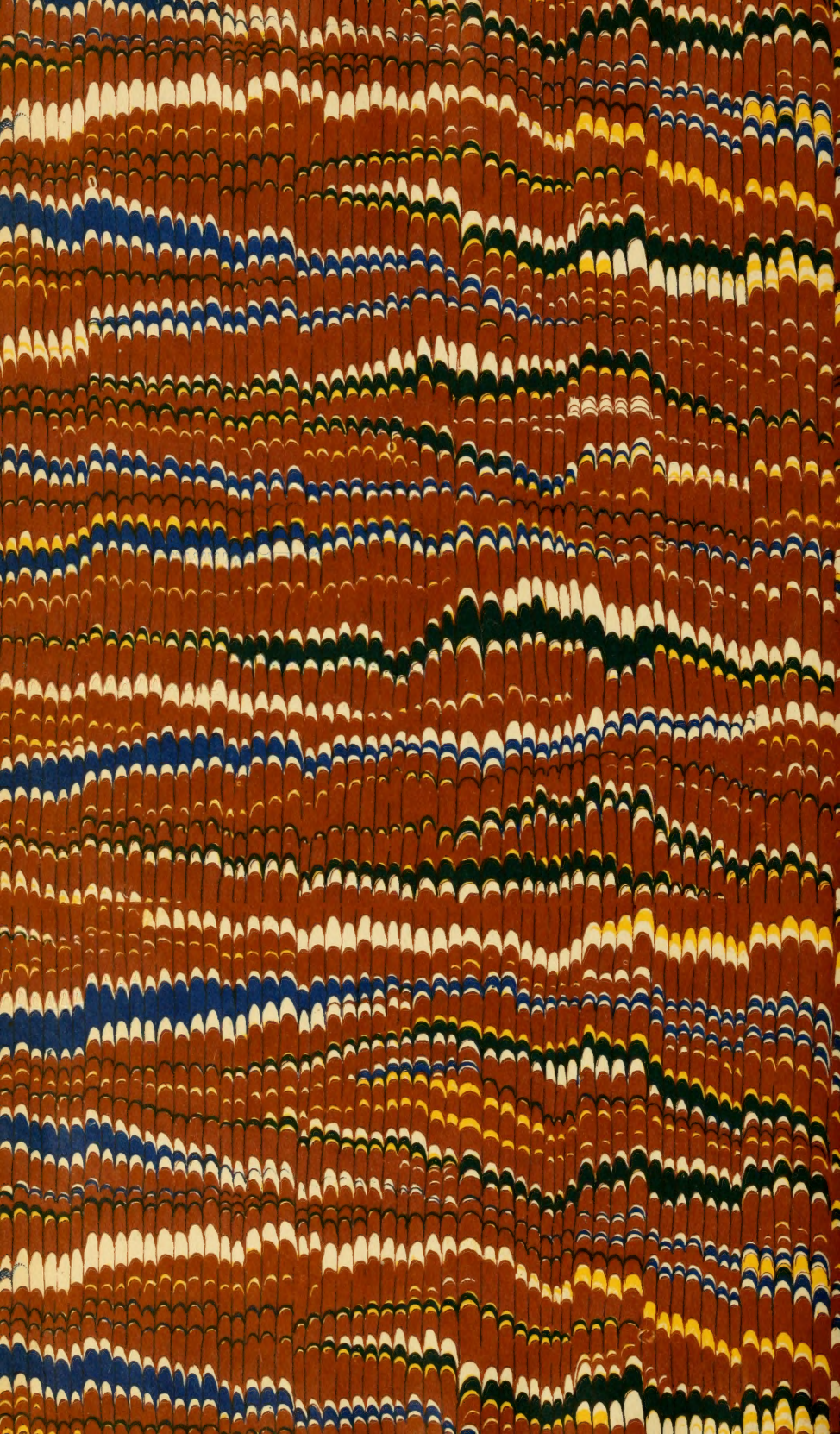
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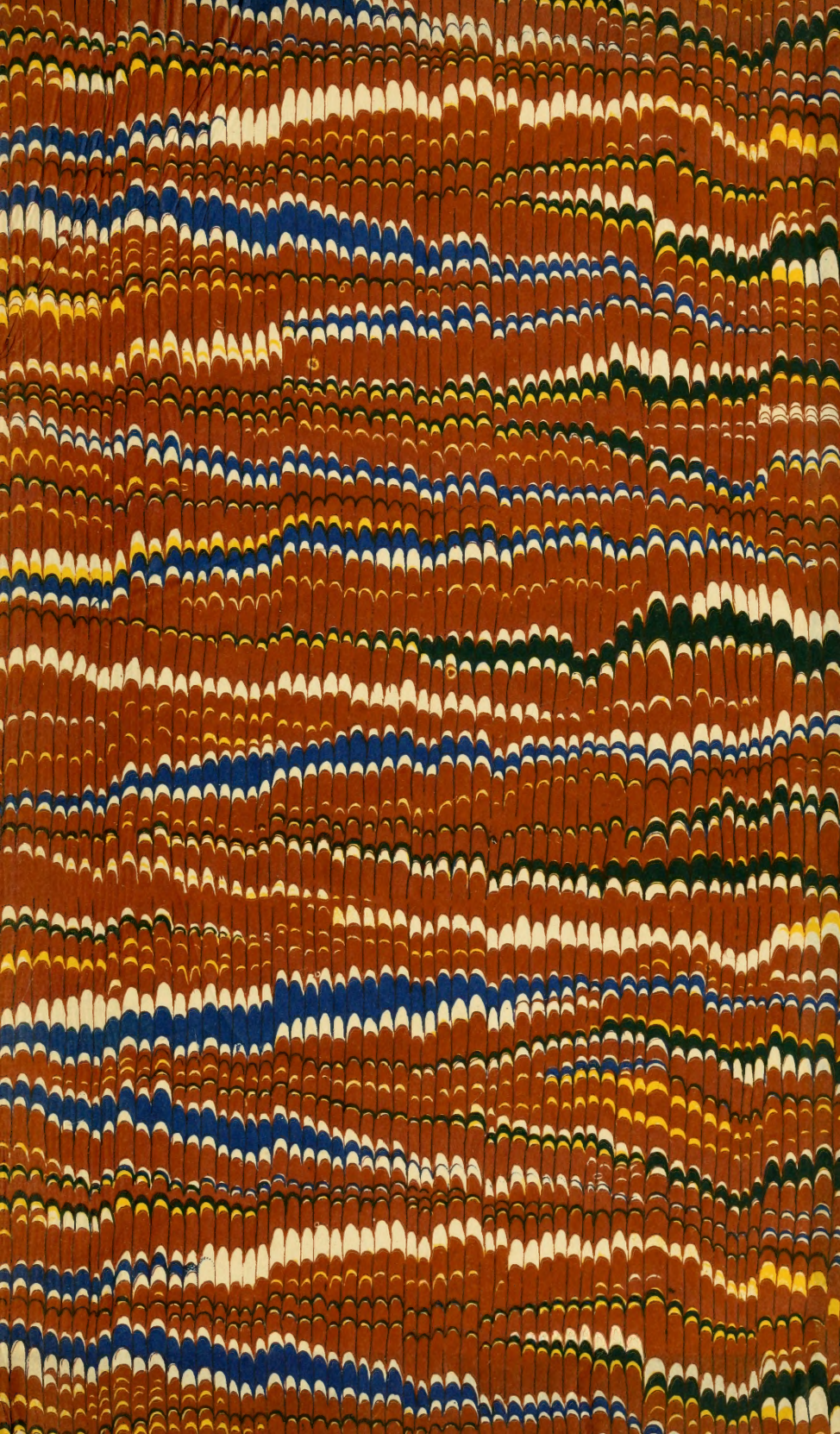
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